YUKON DEVELOPMENT CORPORATION

2003 Progress Report

for CANADA'S CLIMATE CHANGE Voluntary Challenge and Registry Program

Prepared on October 23, 2003

for Robert A. Flemington, *P. Eng.*,

President, Canada's Climate Change Voluntary Challenge and Registry Inc.

YUKON'S ENERGY SOLUTIONS GROUP OF COMPANIES

Yukon Development Corporation

YUKON ENERGY

energy solutions centre

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Photographs courtesy of Peter Long, Yukon Energy, Energy Solutions Centre and Yukon government.

VCR inc.

Gold Champion Level Reporter

CANADIAN Energy Efficiency Alliance

Executive summary

The Yukon's energy solutions group of companies — Yukon Development Corporation and its subsidiaries, Yukon Energy and the Energy Solutions Centre Inc. — is providing this 2003 Progress Report to Canada's Climate Change Voluntary Challenge and Registry Program. Some of the highlights of this year's progress report include:

Continued greenhouse gas reductions through...

Indirect emissions reductions

- **Fridge Exchange Program.** This year, more than 100 Yukon households switched to new ENERGY STAR®-labeled refrigerators through the fridge exchange project, and thereby reduced annual Yukon CO_2e emissions by 75 tonnes;
- **House Calls Energy Efficiency Program.** Through household energy efficiency initiatives, this program continues to reduce by approximately 1,845 tonnes of CO_2e annually;
- **Green Building Design and Support Service.** This year, the service was involved in highly targeted public education and outreach, offering developers project-specific advice, technical support and planning assistance.

Renewable energy system emissions reductions

- **Mayo to Dawson City electricity transmission line**. As a result of this initiative, Yukon Energy is producing 28 fewer tonnes of greenhouse gases each day than it did before the line was completed.
- **Renewable power sales.** This program replaces oil and propane used for space and water heating in commercial and institutional buildings with surplus hydroelectricity and other renewable energy sources. This provides lower heating costs for customers, makes better use of the existing hydro infrastructure, helps to stabilize long-term electrical rates and reduces greenhouse gas emissions.
- **Wind energy**. Eight commercial-scale sites and five household-scale sites were monitored through 2002-2003. Commercial wind turbines currently provide enough electricity to displace 994 tonnes CO_2e annually and hold the promise of much more.

Greater accuracy and comprehensiveness in our calculations of greenhouse gas reductions
This year, the report presents more detailed comparisons of previous predictions with actual subsequent greenhouse gas reductions. And the data is presented more visually for easier understanding. As well, in an effort to provide data that is as comprehensive as possible, we have included data on greenhouse gases resulting from staff air travel.

continued...

Increasing emission reduction target to 36% below 1990 level

Yukon Development is once again increasing its emissions reduction target, this time from 12% to 36% below our 1990 levels. This has been made possible by the Mayo to Dawson City transmission line coming into service, an increase in hydro generation capacity, and greater confidence in ongoing market shifts to renewable energy technologies and solutions.

In 2002, our total greenhouse gas emissions from diesel electric generators, corporate building space heating and vehicle fleet fuel consumption was 12,386 tonnes carbon dioxide equivalent (CO_2e), down 65% from 1990.

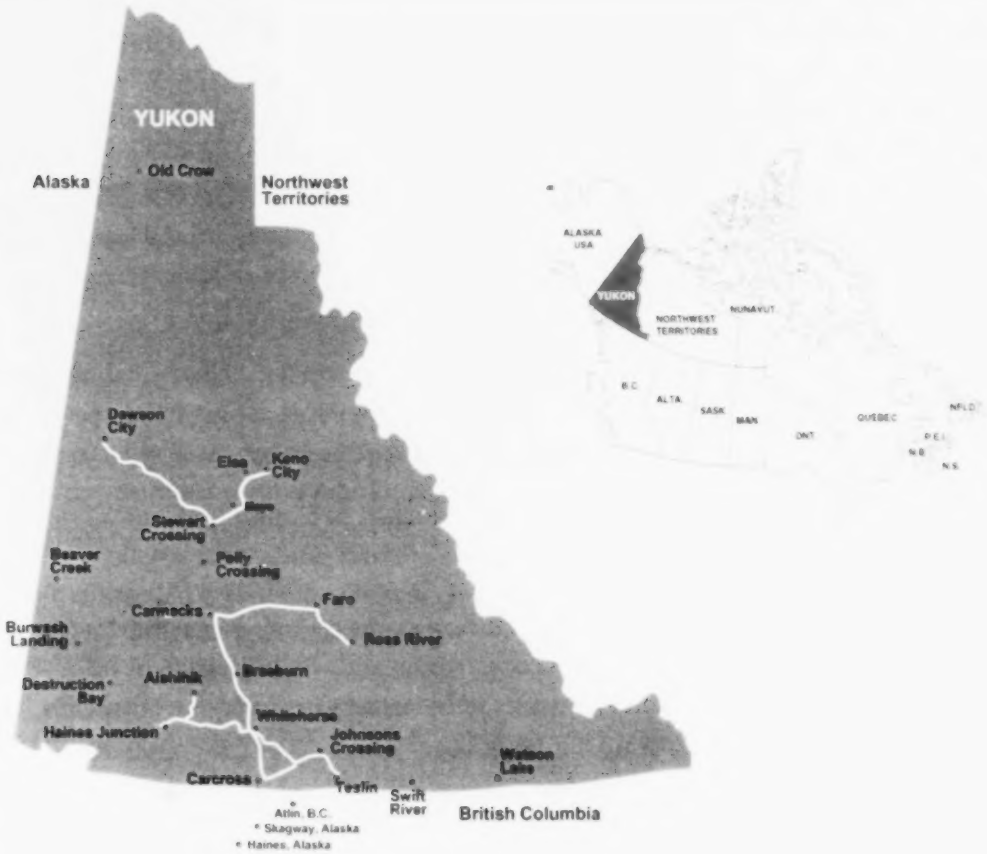
Yukon Development Corporation corporate profile

Yukon Development Corporation is a crown corporation created in 1986 by the *Yukon Development Corporation Act*. It is governed by a board of directors appointed by the Yukon government and has a legislative mandate to participate with the private sector in the sustainable development of the Yukon's economy. Yukon Development's mission is to provide the best-priced, integrated energy solutions and services for Yukon consumers, in the most environmentally and socially responsible manner. This is consistent with the Yukon government's goal of reducing greenhouse gas emissions for the short- and long-term. Yukon Development is doing this by displacing diesel-generated electricity, heating oil and propane through the efficiencies and renewable energy infrastructure investments and initiatives described on the following pages.

Yukon Development has two subsidiary corporations: Yukon Energy Corporation (Yukon Energy) and Energy Solutions Centre Inc., as well as the unincorporated Centre for Environmental Stewardship. All three corporations have head offices in Whitehorse.

Yukon Energy

Governed by a board of directors, Yukon Energy is the primary generator and transmitter of electricity in the territory. As a franchised utility, Yukon Energy is under the jurisdiction of a quasi-judicial regulator, the Yukon Utilities Board and the *Public Utilities*



Map of the Yukon showing communities and power networks.

Act. Yukon Energy's mission is to provide a sufficient supply of safe, reliable electricity and related energy services to customers throughout the Yukon, while following sound business practices and demonstrating leadership in protecting the environment.

Yukon Energy's generating capacity is approximately 116 megawatts (MW) of electricity. (Note that this is two megawatts higher than it was last year due to improvements at both the Aishihik and Mayo hydro facilities undertaken in 2002-2003.) Seventy-seven megawatts of this capacity are provided by hydro facilities located at Whitehorse Rapids, Mayo and Aishihik Lake, and the remaining 39 MW are provided by diesel generators in Whitehorse, Faro, Mayo and Dawson City. Two wind turbines, located on Haeckel Hill near Whitehorse, generate 0.8 MW of electrical energy. The two turbines generate enough energy annually to supply 150 homes.

Yukon Energy serves approximately 14,900 electricity consumers; 1,900 consumers, most of whom live in and around Dawson City, Mayo and Faro, are served directly by Yukon Energy. Indirectly, however, the corporation serves all Yukon communities receiving power from the Whitehorse-Aishihik-Faro hydro network through The Yukon Electrical Company Limited (YECL), including Whitehorse, Southern Lakes, Carcross, Carmacks, Haines Junction, Ross River and Teslin.

Energy Solutions Centre Inc.

In 2000, Yukon Development established Energy Solutions Centre Inc. to encourage and assist Yukon individuals, businesses, communities, municipalities, industry and First Nations to implement projects that will produce energy cost savings and reduce greenhouse gas emissions. The Energy Solutions Centre is a joint initiative between Yukon Development Corporation and Natural Resources Canada. It strives to set the circumpolar standard for cost-effective, renewable and integrated energy services, environmental stewardship and northern innovation in the energy sector. This vision is accomplished by consolidating federal and territorial energy resources, and forging partnerships with the private and public sectors to mobilize projects that result in energy cost-savings and reduced greenhouse gas emissions.

The centre's objective is to produce integrated energy solutions for clients, and catalyze a market shift towards sustainable building design, lower energy demand and greater use of renewable energy. The centre also enhances capacity within the local energy sector through targeted training, conducts research on emerging energy efficiency and renewable energy technologies, and enhances public awareness of climate change through a variety of activities.

Reporting to a board of directors, the centre's managing director provides overall leadership, program coordination and administration. A team of technical consultants and contractors provides technical services, program outreach and leadership in specific program areas.

Chief Executive Officer's message

Despite having achieved the VCR Gold Level Reporter status for the past two years, the Yukon's energy solutions group of companies is not resting on its laurels. Our 2003 *Progress Report for Canada's Climate Change* Voluntary Challenge and Registry Program describes the companies' many successful initiatives. These initiatives continue to reduce the entire Yukon's greenhouse gas emissions, and they demonstrate our continued commitment to reducing greenhouse gases and reporting those reductions annually. In this year's report, we have put added emphasis on reporting emissions reductions that have occurred as a direct result of integrated energy services and technical programs sponsored by one or more of the companies.

The highlight of this year's activities was the completion of the new electric transmission line from the Mayo hydro facility to Dawson City. This was a technically and administratively challenging project, as well as being the biggest capital project ever undertaken by Yukon Energy. The transmission line went into service in early September 2003, and has effectively shut down the diesel electric generators that formerly supplied all of Dawson City's power. Now, each day, Yukon Energy is producing 28 tonnes fewer greenhouse gases than it did before the line was completed!

In close competition for highlight of the year was the Yukon International Wind Conference. This conference was hosted by Yukon Development, Yukon Energy and the Energy Solutions Centre in cooperation with 14 national and international sponsors. The conference provided a unique opportunity for 95 delegates from Canada, Australia, France, Finland and the United States to share advances in cold climate technology. These new technologies are allowing regions with icing and other cold temperature related challenges to extend the geographic limit of practical wind farming, thus enabling greenhouse gas-free electrical generation in an-increasing number of locations.

Our efforts in the energy management field continued to increase over the past year. The scope and volume of activity, coupled with effective partnerships with the public and private sectors, led to a series of practical energy solutions with tangible, measurable outcomes.

Our successes have helped to establish the Yukon as a recognized leader in greenhouse gas reduction through efficiency and renewable energy programs and, increasingly, as a delivery template for duplication in other territories and provinces.

We are strongly committed to sustaining this level of excellence. We plan to expand our role as a catalyst for shifting market demand to energy efficient and renewable energy solutions so that greenhouse gas reducing technologies become standard choices.

Sincerely,

Duncan Sinclair, Chief Executive Officer, Yukon Development Corporation

Managing our greenhouse gas emissions

Staff at every level of Yukon Development, the Energy Solutions Centre and Yukon Energy — from management through technical, project and administrative positions — has a systematic and ongoing involvement in the companies' renewable energy and energy efficiency initiatives. This reality is required by, and driven by, the business objectives that are set by the boards of directors of the three companies, and by the energy policy direction and objectives provided by the Yukon government, Yukon Development Corporation's owner. As well, Yukon Energy conducts its operations in a way that is consistent with ISO 14001 standards. An independent audit of Yukon Energy's Environmental Management System by a team acting under the auspices of the Canadian Electricity Association's Environmental Commitment and Responsibility Program included a review of our annual VCR report.

Yukon Development's board of directors has established a five-year corporate plan and approves specific business plans annually. These plans include objectives, priorities and corporate performance indicators that establish specific greenhouse gas emissions targets. Senior managers monitor the planning and implementation of greenhouse gas reduction initiatives as part of the established routine, and ensure we are on track as we go through the processes of developing our corporate plan, annual business plan and quarterly reporting to the board of directors. As a contribution to business planning and target setting, Yukon Development's *Action Plan for Reducing Greenhouse Gas Emissions* is reviewed and amended based on forecast energy demand, supply options and verification of emissions reductions.

Last year, we reported an increased commitment to greenhouse gas reduction, from a 6% to a 12% reduction from our 1990 emissions. Based on progress made since then, such as putting the Mayo to Dawson City transmission line into service, increasing the hydro generation capacity, and growing reductions in greenhouse gas emissions through the introduction of renewable energy alternatives, the commitment has been increased to 36%. In absolute terms, this means we plan to reduce our emissions from their 1990 level of 34,960 tonnes CO_2e to 22,375 tonnes CO_2e by 2010, based on a four-year average from 2008 to 2012.

Yukon Development Corporation's greenhouse gas inventory

Since 1990, most of Yukon Development's greenhouse gas emissions have resulted from diesel generators used to supplement Yukon Energy's hydro generators on the Whitehorse-Aishihik-Faro (WAF) and Mayo electrical networks and to supply all the power for Dawson City. At the end of August 2003, the Mayo to Dawson City transmission line was completed and now Dawson City's electricity is supplied by hydro generation. This means that, for the first time, we are supplying all our customers' baseload demand with greenhouse gas-free hydro-generated electricity. Now diesel is being used only to supplement hydro generation in case a backup power supply is required, or if peak loads exceed the hydro generators' capacity.

We are continuing to reduce the need to use the diesel generators to meet peak demand by increasing customer energy efficiency, influencing electrical load timing and increasing the supply of renewable energy by supplementing power produced through hydro generation with power produced through wind generation.

Yukon Energy, annual diesel generation (GWh), 1990–2002

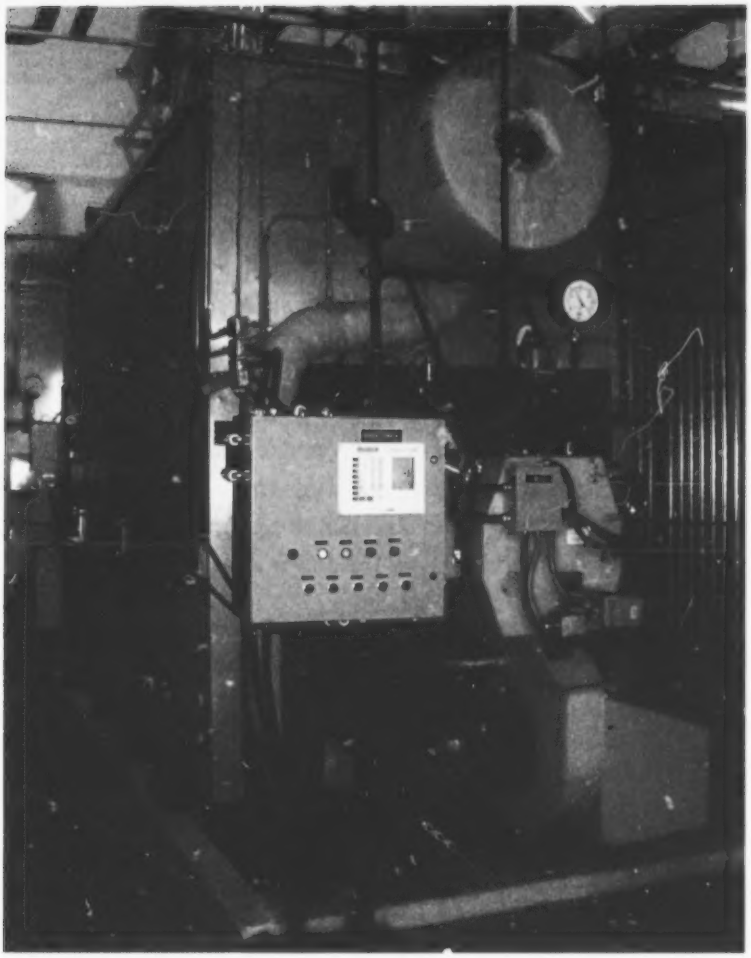
The table below shows diesel generation from our base year of 1990 through to 2002.

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
WAF/Mayo	33	26	33	16	1	40	105	82	7	12	1	1	1
Dawson	11	9	13	12	13	13	13	14	15	15	15	14	15
Total diesel	**44**	**35**	**46**	**28**	**14**	**53**	**118**	**96**	**22**	**27**	**16**	**15**	**16**

Note that diesel generation totals were higher in 2002 than in 2001 even though temperature data shows that 2002 was actually a warmer year than 2001. The increase in diesel generation is attributed to generating in Mayo during the hydro facility upgrades and during the frazil ice problems at the Whitehorse Rapids Hydro plant.

Clearing frazil ice at the Whitehorse Rapids dam.

Up until 1998, the main factor that caused diesel generation to fluctuate was whether or not the Faro mine was operating, as the mine accounted for 40% of the WAF network load. When the mine was operating, the electrical network serving it with electricity was in a hydro deficit of up to 80 GWh per year. This deficit was made up with diesel generation. With the mine shut down, the network moved to a hydro surplus condition of up to 100 GWh per year. Yukon Energy and the Energy Solutions Centre have made considerable progress in utilizing the surplus hydro energy available on the WAF network for interruptible electricity sales which were used for displacing heating fuel. These sales were 8 GWh per year at the end of 2002 and are expected to be



Boiler at Whitehorse General Hospital uses surplus hydropower, displacing fossil fuel.

at 14 GWh per year by the end of 2003 and greater than 22 GWh per year by the end of 2004.

Other factors that increased diesel generation were the extremely cold winters of 1996 and 1997 and an Order-in-Council in 1999, disallowing Yukon Energy's use of the last two feet of its licensed draw down on the Aishihik reservoir.

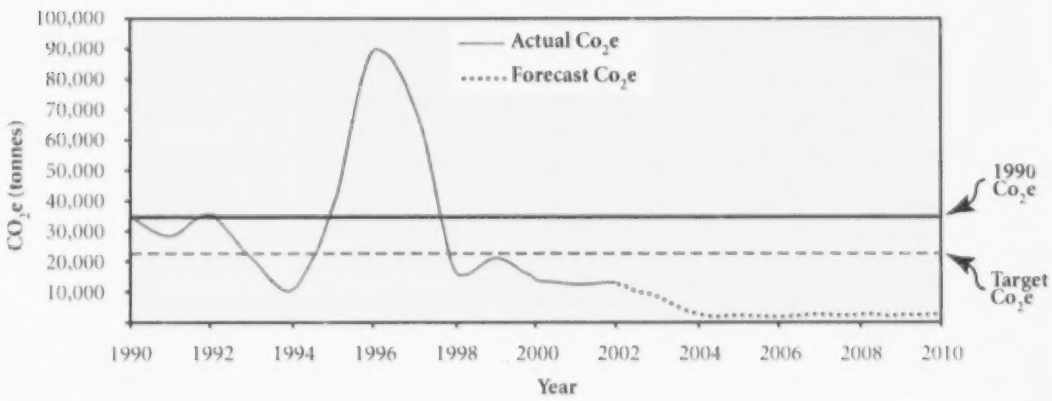
We have based the estimates of our greenhouse gas emissions on the number of litres of diesel used to fuel the diesel generators. We calculated the tonnes of Carbon Dioxide Equivalent (CO_2e) emissions resulting from burning this fuel from 1990 to 2001 using the greenhouse gas emissions factors included in the Voluntary Challenge and Registry Handbook for light and heavy industrial oil. After further researching the most appropriate emission factors with VCR staff and Environment Canada staff, beginning with the data for 2002, we will only use the emission factors given for light industrial oil. Note that this lowers the calculated greenhouse gas emissions slightly from last year's report for our inventory as well as for some of our greenhouse gas reduction activities. Appendix A provides tables that detail our calculations.

Projections of our greenhouse gas emissions are based on Yukon Energy's long-range load forecast. The forecast was updated in 2003 and differs from those used in the last two VCR reports in that we are no longer including a high load growth scenario. This is because future load growth of any significance would most likely be due to mine openings. The predicted opening of the United Keno Hills mine in 2001 and the Faro mine reopening in 2002 did not occur and it is unlikely that there will be any significant new mining loads in the Yukon in the next five years. Currently, the Yukon's population is not growing and there are no large mines in operation. The current forecast assumes that this trend will continue and therefore shows very little increase in the diesel-electrical load growth. The most significant element of our electricity sales growth is forecast to be in the secondary energy sales area, which is all hydro-generated and so will not produce greenhouse gas emissions.

Our greenhouse gas inventory also includes emissions from our vehicle fleet and the oil furnaces used to heat our corporate buildings. We have pertinent data beginning with 2000. Much of the data for the previous years were lost in a fire that destroyed the corporate offices in October 1997.

The following graph and the table on the next page show our calculated historic and forecast greenhouse gas emissions.

Tonnes CO_2e emissions: actual and forecast



Indirect emissions

In addition to the greenhouse gas emissions listed above, there is another source of greenhouse gas emissions not directly related to electricity production. This is from the propane used to heat the salmon and freshwater fish hatchery sponsored by Yukon Energy in Whitehorse. Quantities of propane used at the hatchery have been tracked since 1999 so the associated greenhouse gases can be calculated back to that year. Since March 2003, when we began heating the facility with a combination of geothermal energy and a heat pump powered by surplus hydro-electricity, we have not needed to use the propane heaters.

Whitehorse Rapids Fish Hatchery, tonnes of CO_2e emissions from propane heating.

Year	CO_2	CH_4	N_2O	Total emissions
1999 (partial year)	5	0	0	5
2000	17	0	0	17
2001	14	0	0	14
2002	6	0	0	6

We have also been able to calculate the indirect emissions resulting from air travel done by Yukon Development and Energy Solutions Centre staff in 2002. Total CO_2e for this is 14 tonnes. (Note that Table 6 in the Registry Guide does not identify separate gas emissions for air travel.)

Direct emissions: Yukon Development greenhouse gas emissions from electricity generation, space heating for corporate buildings and fuel consumption in corporate vehicles 1990–2010.

	Year	Tonnes of CO_2e emissions					Emissions intensity, t CO_2e/GWh	
		CO_2	CH_4	N_2O	Total emissions	% change from 1990	diesel generation	total generation
Actual	**1990**	34,903	9	49	34,960	0%	795	76
	1991	28,531	8	40	28,579	-18%	817	66
	1992	35,691	15	49	35,755	2%	777	78
	1993	21,872	6	30	21,908	-37%	782	71
	1994	10,557	5	14	10,576	-70%	755	40
	1995	40,063	12	55	40,131	15%	757	111
	1996	90,324	35	124	90,483	159%	767	191
	1997	72,092	14	101	72,207	107%	752	207
	1998	17,146	6	24	17,176	-51%	781	60
	1999	21,463	9	29	21,501	-38%	796	80
	generation	12,926	6	18	12,950			
	fleet	297	1	15	312			
	heat	196	0	0	197			
	total 2000	13,419	7	33	13,459	-62%	841	50
	generation	12,202	6	17	12,224			
	fleet	347	1	18	365			
	heat	69	0	0	69			
	total 2001	12,617	7	34	12,658	-64%	838	46
	generation	11,912	1	17	11,929			
	fleet	350	1	19	369			
	heat	84	0	0	85			
	total 2002	12,346	1	36	12,383	-65%	765	44
	FORECAST							
Forecast	**2003**	7982	1	28	8,012	-77%	819	30
	2004	1751	1	19	1,770	-95%	1029	7
	2005	1866	1	19	1,886	-95%	1008	7
	2006	1881	1	19	1,901	-95%	1006	7
	2007	1897	1	19	1,917	-95%	1004	7
	2008	1897	1	19	1,917	-95%	1004	7
	2009	1897	1	19	1,917	-95%	1004	7
	2010	1897	1	19	1,917	-95%	1004	7

Note: For the forecast years, the average of the 2000 to 2003 space heating and fleet emissions amounts are used.

Target setting

Yukon Development Corporation's commitment is to reduce, by 2010, our greenhouse gas emissions by 36% from our 1990 emissions.

In addition, we will catalyze reductions in greenhouse gas emissions by others throughout the Yukon, because of our territory-wide influence. Objectives for the 2002-2006 period that will reduce Yukon-wide greenhouse gas emissions include:

- reducing Yukon Energy's diesel use to less than one percent of total demand on the Whitehorse-Aishihik-Faro network. Any diesel use will be for peak periods and reliability only. *This target was met as of August 2003.*
- generating 10 GWh per year in sales of renewable, surplus hydropower. *This target has been met for 2003.*
- increasing the cumulative residential participation in our energy efficiency programs to 75% of rural households in diesel-generation communities and 15% of households in Whitehorse and other hydro-generation communities. *There was 57% rural household participation and 9% hydro generation participation at the end of 2002.*
- increasing participation in our commercial energy management programs to 50% of new commercial, municipal, First Nation and public government building construction projects. *There was approximately 10% participation at the end of 2002, to be verified against forthcoming base-line data.*

New commercial construction in Whitehorse.

- increasing our wind generation by up to one megawatt. *Two new wind/diesel technical feasibility studies are currently in progress.*

- minimizing the impact of energy supply and end use on the environment by developing two new environmental projects linked to existing and future energy supply and related natural resource development, each year. *This target was met in 2000, 2001, 2002 and 2003.*

Yukon Development's board of directors reviews and, where necessary, revises these targets every year during its corporate business planning process. This contributes to annual updates to our *Action Plan for Reducing Greenhouse Gas Emissions* filed with VCR Inc. The boards of Yukon Energy and the Energy Solutions Centre undertake similar reviews during their business planning processes. Also, Yukon Energy tracks progress made towards operational targets, as well as implementation of its environmental policy and management system consistent with the ISO 14001 standard, in its yearly Environmental Commitment and Responsibility (ECR) program report to the Canadian Electricity Association. Finally, the people of the Yukon, through the Yukon government Minister responsible and the members of the Yukon Legislative Assembly, have the opportunity to review these targets and the progress when Yukon Development's plans and activities are debated in the Yukon legislature and when the corporation's annual report is tabled in the legislature. Yukon Development's chair of the board of directors and its chief executive officer also appear annually before elected members to answer questions on any matter. Each year's VCR report is published and distributed broadly and is available through our web site.

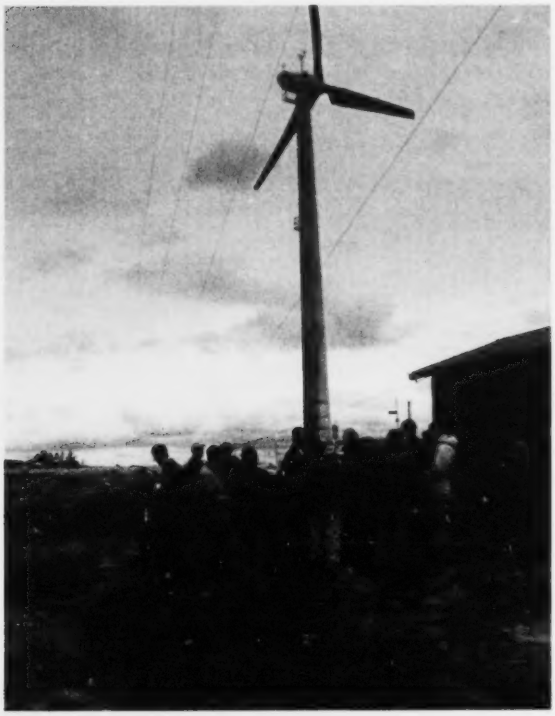
Meeting the targets

In each year's report, we describe the companies' many initiatives to reduce greenhouse gas emissions, both within the companies' operations, and throughout the territory. In this year's report, we provide an update on initiatives described in past reports and we introduce new ones. Each initiative is categorized as either an indirect emission reduction activity (for our electricity consumption reduction initiatives) or as a renewable energy system emission reduction activity (where we are switching from a fossil fuel energy source to a renewable, non-greenhouse gas emitting energy source).

Where possible, we have calculated the emissions reductions from our initiatives and stated whether the calculations are based on the actual amount of fuel displaced, or on estimated amounts of fuel displaced when we do not yet have enough data. We plan to recalculate and report emissions reductions each year, as we accumulate enough data to base our work on actual, rather than estimated volumes of fuel. This year we have summarized the emissions reductions graphically to provide a more visual portrayal of the companies' impact in reducing greenhouse gas emissions throughout the Yukon.

New initiatives

- **Yukon International Wind Conference**
  renewable energy system emission reduction



Visiting the wind turbines on Haeckel Hill as part of the wind energy conference.

In May 2003, Yukon Energy hosted the Yukon International Wind Conference, which was an opportunity to learn about the most current products, services and operational experiences relevant to cold climates. It brought together the client and supplier sides of the wind industry to encourage supplier side strategic alliances as well as supplier-client alliances. It was also an opportunity to learn, share ideas and discuss future opportunities to help overcome the challenges in developing wind technology in other cold climates. The conference provided delegates from Canada, Australia, France, Finland and the United States with a unique opportunity to share advances in cold climate technology.

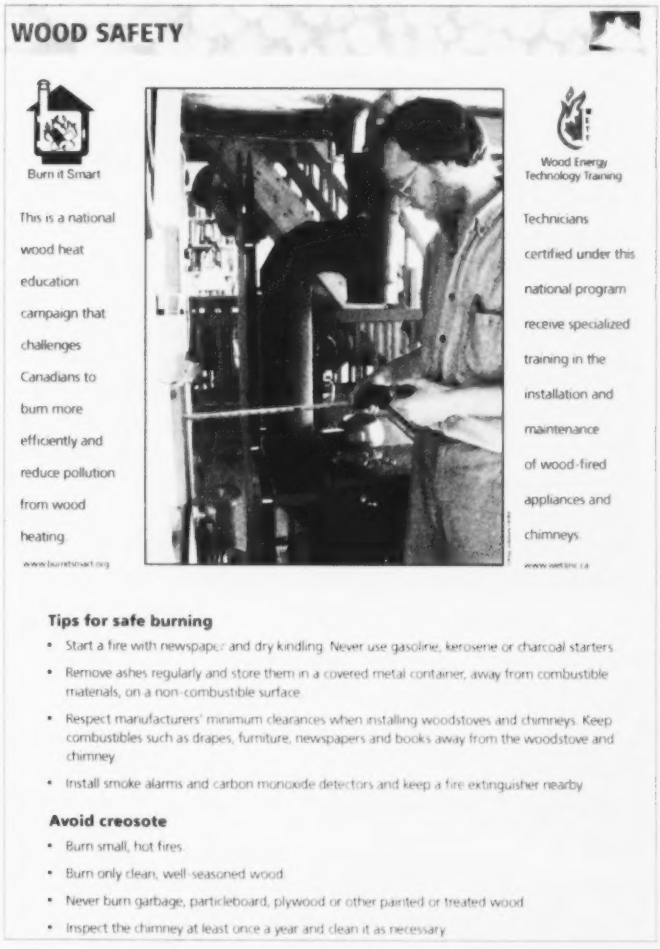
• **Wood Energy Education Campaign**
renewable energy system emission reduction

Heating with wood is seen by many as a CO_2 neutral way to stay warm. As long as forests are being regenerated at a rate that matches or exceeds fuel wood harvesting, this is true. In the Yukon, most fuel wood comes from forest fire sites that are relatively close to communities, so not only is it seen as CO_2 neutral, but, unlike oil or propane, it does not have to be transported long distances from outside the territory.

In recent years, there has been considerable focus on local air quality concerns associated with residential wood combustion, which could lead to a market shift towards oil heating in the Yukon. This has lead Yukon Development and the Energy Solutions Centre to become involved in local and national campaigns to increase safety, efficiency and air quality by providing information and focused incentives to householders to burn wood using better methods and technology.

From September 2002 to March 2003, Yukon Development and Natural Resources Canada sponsored the Yukon Burn It Smart project which was delivered by the Energy Solutions Centre and the Yukon Conservation Society. The project included a series of 24 public workshops, a mobile demonstration unit, newspaper articles and other forums to encourage people to upgrade their existing wood heating systems to low-emission woodstoves, and to use best practices when operating any woodstove to conserve fuel wood and decrease emissions. Low-emission stoves, which are certified by the US Environmental Protection Agency, produce up to 90% less smoke and use up to one-third less wood than conventional units. This means 30% less CO_2 and N_2O and 85% less CH_4 are emitted from chimneys connected to low-emission stoves.

One of the panels about wood burning created for the display at Yukon shows.


WOOD SAFETY
Burn it Smart
This is a national wood heat education campaign that challenges Canadians to burn more efficiently and reduce pollution from wood heating.
www.burnitsmart.org
Wood Energy Technology Training
Technicians certified under this national program receive specialized training in the installation and maintenance of wood-fired appliances and chimneys.
www.wetinc.ca
Tips for safe burning
• Start a fire with newspaper and dry kindling. Never use gasoline, kerosene or charcoal starters.
• Remove ashes regularly and store them in a covered metal container, away from combustible materials, on a non-combustible surface.
• Respect manufacturers' minimum clearances when installing woodstoves and chimneys. Keep combustibles such as drapes, furniture, newspapers and books away from the woodstove and chimney.
• Install smoke alarms and carbon monoxide detectors and keep a fire extinguisher nearby.
Avoid creosote
• Burn small, hot fires.
• Burn only clean, well-seasoned wood.
• Never burn garbage, particleboard, plywood or other painted or treated wood.
• Inspect the chimney at least once a year and clean it as necessary.

In October 2002 the Energy Solutions Centre and Yukon Development published an 18-page, full-colour booklet called *The Lure and Lore of Wood* that provides a unique historical look at wood use in the Yukon and promotes the key messages about heating with wood today in a safe, efficient and healthy way. Display panels, created using the written material used in the booklet, were taken to the Energy Fair and the Yukon-wide Trade Show. A video, endorsed by the Wood Energy Technicians of British Columbia and the Atlantic Wood Energy Technicians Association, was adapted and used to demonstrate optimal wood heating technologies and methods. This video was distributed broadly in the Yukon.

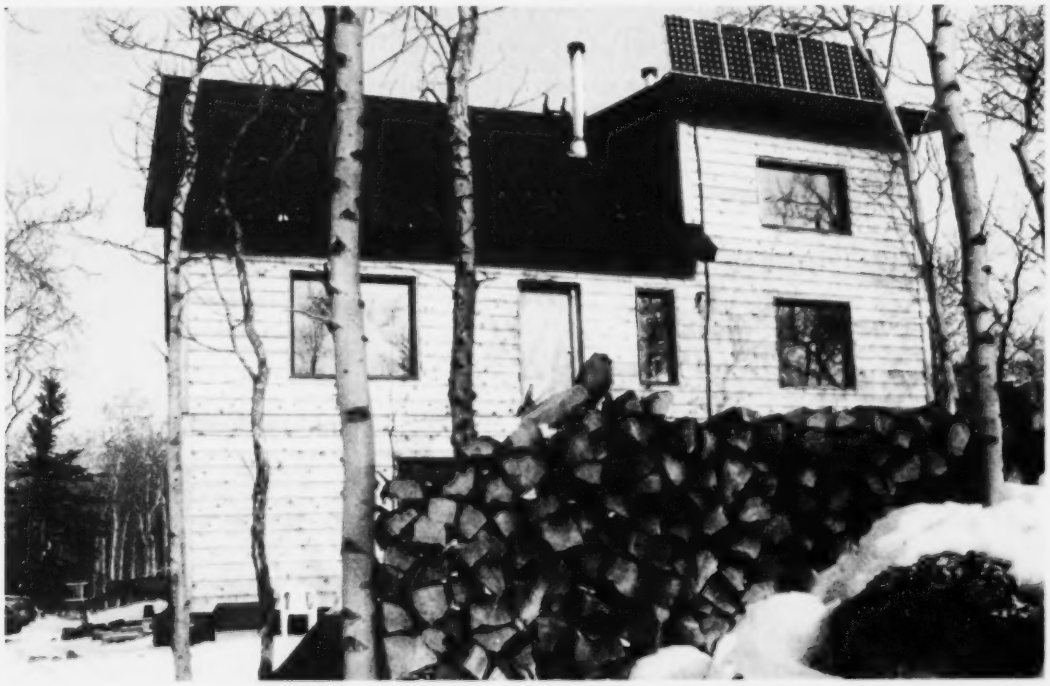
• **Energy Solutions Centre's Renewable Power Technology Studies**
renewable energy system emission reduction

An important step in shifting the market away from greenhouse gas emitting energy choices and towards renewable, non-greenhouse gas emitting, or green-energy sources, is to convince people that their energy needs can be met with green-energy sources. One way to do this is to make the business case for green-energy sources using existing energy modeling programs such as RETScreen and Hot 2000. However, because these programs were designed to model more southerly scenarios than those found in the Yukon, they are not as effective here as in other regions of Canada. In the fall of 2002, the Energy Solutions Centre began three research projects to gather information that will be added to the RETScreen and Hot 2000 modeling software to enhance these programs' northern relevance.

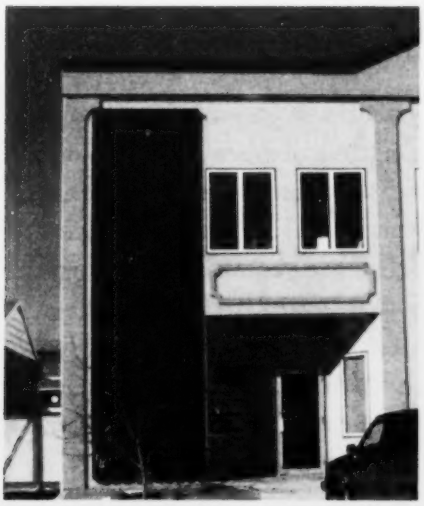
1. Off-grid renewable energy technology study: In collaboration with Natural Resources Canada, the Energy Solutions Centre is delivering this three-phase research and development project.

Phase 1. This involves gathering base-line data from off-grid residences to determine renewable energy usage in the Yukon and to identify obstacles and opportunities for encouraging the use of renewable energy in the Yukon. The data is coming from a variety of sources: a statistically representative, territory-wide survey that was completed in the late fall of 2002 and spring of 2003; in-depth energy audits completed in the spring of 2003 on 30 homes; and long-term data collection from five to 10 houses.

Phase 2. Three case studies from the baseline study will be selected for an integrated design charette. This integrated approach will consider reducing the demand for heating



Solar panels on an off-grid green Yukon home.



LEFT Solarwall on Energy Solutions Centre building. RIGHT Three solar power arrays to be evaluated by the Energy Solutions Centre.

energy, as well as increasing the use of renewable electrical energy in the homes. Where feasible, the results of the charette will be applied to the case studies and monitored for up to two years. The purpose is to quantify the benefits of the integrated design concepts generated by the charette, and to assess the accuracy of computer software programs (Hot 2000 and RETscreen) with respect to predicting the results of applying renewable energy technologies in northern conditions.

Phase 3. Finally, we will develop and distribute, across Canada, a reference guide for Canadians living off-grid including case studies to demonstrate the benefits of an integrated approach.

2. Solar wall project: In March 2003, as part of Yukon Development's Applied Research and Development Program, the Energy Solutions Centre installed a solar wall, SOLARWALL®, on the building that houses its own offices as well as those of Yukon Development's corporate offices. This SOLARWALL® demonstration is the first in the Yukon. It is a simple, cost-effective, reliable technology that collects solar energy using a panel of dark-coloured metal. This panel, mounted on a south-facing wall, absorbs solar energy and becomes warm. Because the panel has many very small holes that allow air to pass from the outside to behind the panel, that air becomes warm. It is then drawn into the existing ventilation system through the space between the panel and existing wall of the building. As well as being monitored and evaluated for its performance at Whitehorse's latitude, the SOLARWALL® is now being used to preheat make-up air for the building.

3. Solar hot water heating study: In the summer of 2003, also as part of Yukon Development's Applied Research and Development Program, the Energy Solutions Centre began a study to evaluate the performance of three kinds of solar heating arrays in Whitehorse. For this study, the Energy Solutions Centre installed a flat plate panel, a flat plate glazed panel and an evacuated tube panel on the roof of the building that houses the Energy Solutions Centre and Yukon Development. Data is monitored and accessible electronically from anywhere in Canada and is currently being summarized monthly.

• **Hydro Generation Facility Upgrades**
renewable energy systems emission reduction

As part of ongoing upgrades at Yukon Energy facilities, a runner upgrade along with other essential maintenance work was performed this year on the 50-year-old Mayo hydro plant. Major work consisted of installing new, high-capacity Frances turbines in order to increase the capacity of one hydro unit by 21% and the second unit by 11.5%. In conjunction with the runner upgrade, the bearings and the exciter were replaced and the rotor and stator were cleaned. By the end of 2002, the Mayo facility had a 5.5 MW capacity in both summer and winter.

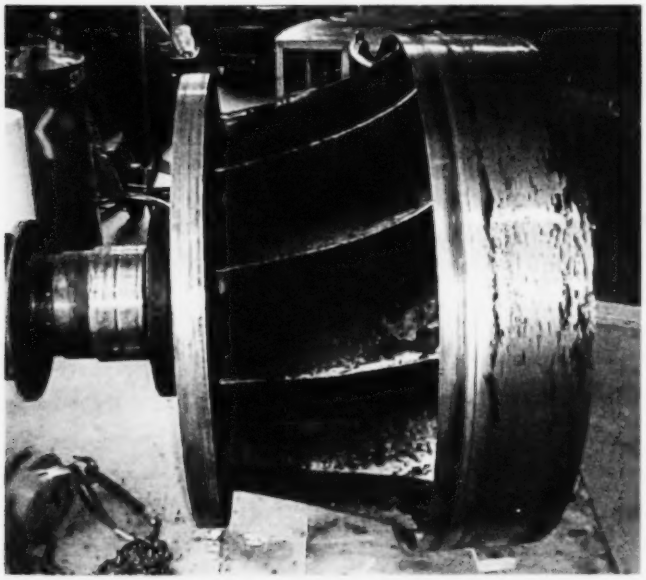
The Aishihik hydro facility will also be seeing a capacity increase in both summer and winter as a result of electrical generator rewinding occurring in 2003 and 2004. Its capacity is expected to increase from 30 to 31.5 MW by the end of 2003 and to 33 MW by the end of 2004. This means that less diesel will be needed on the Whitehorse-Aishihik-Faro electrical network to meet winter demand peaks. Plus, there is a further opportunity to displace fossil fuel heating with discounted surplus hydro power. In the spring of 2003, Yukon Energy renewed its license for the Aishihik facility for 17 years, ensuring a stable supply of non-greenhouse gas emitting electricity for the long term.

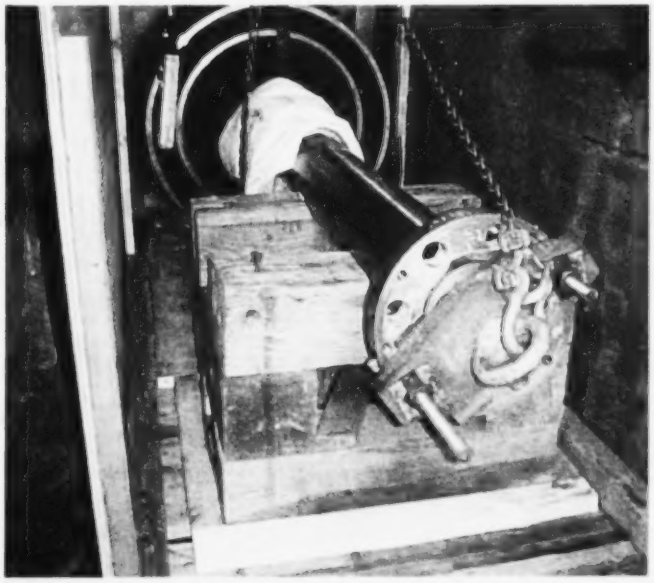
Updates

• **Mayo to Dawson City Transmission Line**
renewable energy system emission reduction

Yukon Energy's resources in 2002 and 2003 were very much focused on building a new transmission line, the largest capital project undertaken in the history of the corporation. This 230-kilometre line extends from the Mayo hydro facility to Dawson City. Along with supplying the communities with renewable, non-greenhouse gas emitting electricity, the new line will result in a CO_2e emission reduction of approximately 11,209 tonnes per

Runner upgrade at the Mayo hydro plant.





Wires on the Mayo to Dawson City transmission line.

year (11,171 tonnes CO_2, under one tonne CH_4 and 38 tonnes N_2O). The line is currently displacing approximately 10,000 litres of fuel per day which amounts to a reduction of approximately 28 tonnes CO_2e.

We reported last year that the transmission line was due to be commissioned in November 2002. The construction of the transmission line did progress substantially in 2002, however, the project was not completed until late summer, 2003 due to a number of challenges, including having to accommodate routing changes around the Dawson City airport because of a change in federal regulations. Yukon Energy also took the opportunity during construction to install additional infrastructure in the Hunker Creek area near Dawson City to provide service to customers presently without access to power. As of October 2003, planning is proceeding to connect the community of Stewart Crossing to the Mayo to Dawson transmission line. This will displace a 0.3 MW diesel-electric generator with hydro electricity. The tie-in is expected to be completed by the end of 2004.

The new transmission system between Mayo and Dawson City with links to Stewart Crossing is part of the larger goal to expand the Yukon's renewable electrical energy network to eventually connect all Yukon communities and all electrical generating sources.

- **RENEWABLE POWER SALES**
  renewable energy systems emissions reduction

Over the past year, Yukon Development continued with the Renewable Power Sales Program. This program replaces oil and propane used for space and water heating in commercial and institutional buildings with surplus hydro electricity and other renewable energy sources. The program has a number of advantages:

- lower heating costs for customers because the surplus hydro electricity is sold at a rate lower than the cost of using oil or propane;
- better use of the existing hydro infrastructure;
- long-term electrical rate stabilization; and
- reduced greenhouse gas emissions.

The table on the next page summarizes the annual emissions reductions attributable to this program. See Appendix B for the detailed calculations.

A key component of the Renewable Power Sales program is the Commercial Energy Audit Service, offered by the Energy Solutions Centre. Through the Commercial Energy Audit Service, the centre helps train and certify local commercial energy auditors based on the Canadian Institute for Energy Training program. This initiative was created in 2000 by Yukon Development Corporation, Yukon Energy and Yukon Housing Corporation.

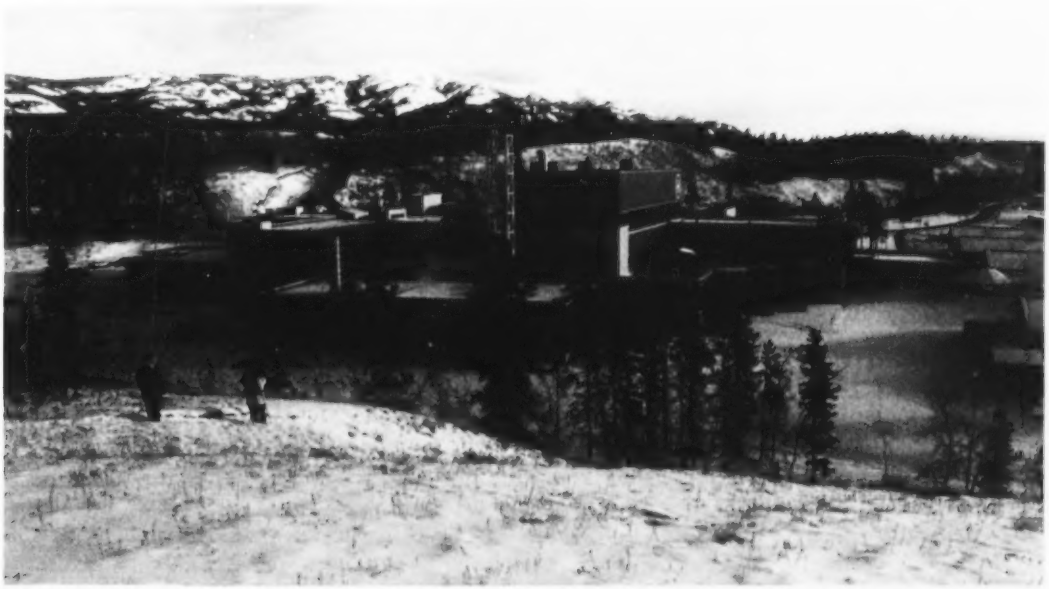
Yukon College, a buyer of surplus power.

Tonnes of annual CO_2e emissions reduced due to Yukon Development's Renewable Power Sales Incentive Program.

Building	Conversion date	CO_2e emissions reduced annually (tonnes)				
		**CH_4	N_2O	CO_2	Total	A/E*
Yukon College	2001	0	5	1,352	1,357	A
Andrew Philipsen Law Centre	2001	0	1	211	212	A
Extended Care Facility	2001	0	4	1,061	1,064	A
YDC/ESC corporate building	2002	0	0	23	23	A
Holy Family School	2002	0	1	59	60	A
Duncan's Holdings Ltd.	2002	0	0	13	13	E
Yukon News	Dec. 2002	0	0	13	13	E
J.V. Clarke School	Jan. 2003	0	1	264	264	E
Yukon Honda	Feb. 2003	0	0	142	142	E
Whitehorse Fish Hatchery	Mar. 2003	0	0	12	13	A
Yukon Brewing Co. (was Chilkoot Brewery)	Mar. 2003	0	0	80	80	E
Whitehorse Hospital	June 2003	0	9	2,576	2,585	E
Quadra Equities	June 2003	0	0	28	29	E
Ricky's Restaurant	July 2003	0	0	39	39	E
Superstore	Oct. 2003	0	5	225	230	E
Boston Pizza	2004	0	4	159	162	E
High Country Inn	2004	0	1	682	683	E
Aquatic Centre	2004	0	4	1,075	1,079	E
Downtown Hotel in Dawson City	2004	0	0	133	133	E
Prospector Building	2004	0	0	39	39	E
Total		**1**	**35**	**8,184**	**8,220**	

*"A" designates emission reductions based on actual fuel displaced. "E" designates emission reductions based on estimated fuel displaced.
**Numbers round to zero although they total to one.

Whitehorse General Hospital, a buyer of surplus energy.



Audits provide essential baseline information for determining integrated energy solutions that are technically and financially appropriate for improving building energy management. They also assess the greenhouse gas emissions reductions that can be expected. Since the inception of the service, 14 people have qualified as commercial energy auditors. In addition, the Centre uses a consortium of Yukon architects and mechanical and electrical engineering firms to audit more specialized projects.

- **FRIDGE EXCHANGE PROJECT**
  indirect emission reduction

Over the past year, more than 100 Yukon households switched to new ENERGY STAR®-labeled refrigerators through the Fridge Exchange project. At a savings of 1,000 kWh per refrigerator, per year, this project has reduced annual Yukon CO_2e emissions by 75 tonnes (74 tonnes CO_2 and less than 1 tonne each CH_4 and N_2O).

The program offers incentives to replace 10-year and older refrigerators with new "best in class" energy efficient models, and ensures that the old appliances are properly decommissioned and recycled. In communities relying on diesel-generated electricity, consumers receive a $200 rebate to purchase a new ENERGY STAR®-labeled refrigerator, along with free delivery and removal of the old appliance. People residing in hydroelectric zones have their old refrigerators removed and recycled for free.

The project is being considered as a template by other industry associations and Canadian jurisdictions. In June 2003, Yukon Development was a major presenter at the ENERGY STAR® conference in Toronto. There, Natural Resources Canada presented Yukon Development with the ENERGY STAR® Market Transformation Recognition Award for Provincial/Territorial Governments.

The Fridge Exchange is one part of Yukon Development's Energy Efficiency Appliance Initiative. Local appliance retailers and service personnel also benefit from this initiative

by receiving training in EnerGuide® and ENERGY STAR® programs and being advised of the advantages of keeping these appliances in stock.

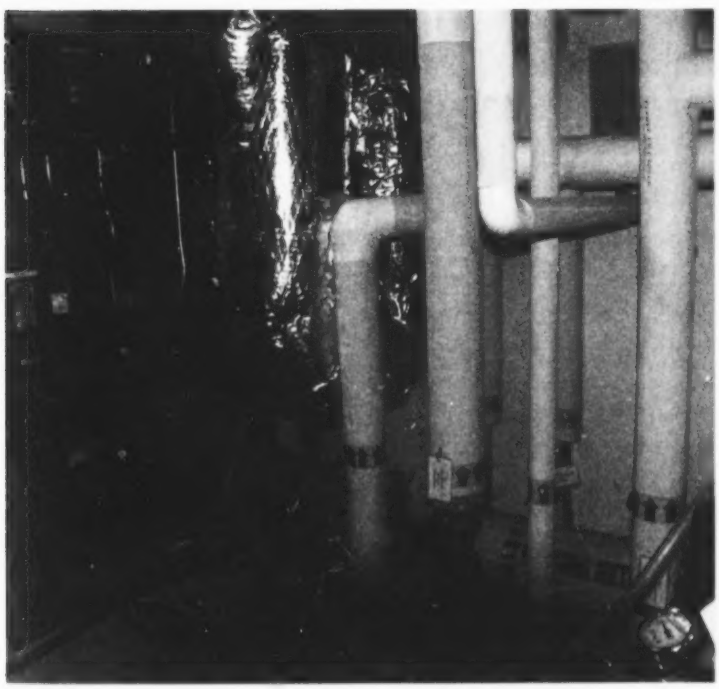
Companies that complete the training and agree to promote ENERGY STAR®-labeled appliances are eligible for financial incentives from the sale of energy efficient refrigerators under the Fridge Exchange Program. Yukon retailers enthusiastically supported the program and as a result, ENERGY STAR®-labeled appliances are more readily available on showroom floors in the Yukon.

• **GEOTHERMAL RESOURCE ASSESSMENT AND DEVELOPMENT PROGRAM**
renewable energy system emission reduction

In last year's report, we described our community-by-community geothermal resource assessment. The study's objective is to identify the ground source heat pump potential for specific applications in building retrofit and new building markets. The data yielded by that territory-wide study has allowed us to identify priority areas for consideration. Three of these are described below:

Haines Junction municipal groundwater heat project: In late 2002, the Village of Haines Junction decided to drill a new community well. The result was an artesian well 369 metres deep, with a hydrostatic head of approximately 59 metres above the ground surface. The well flows at 13 litres per second with an estimated long-term safe yield of 27 litres per second. What attracted the interest of the Energy Solutions Centre staff was the hydrostatic head pressure and surprising natural warm water temperature of 16.9°C. This meant Haines Junction would be able to reduce significantly, and possibly eliminate, supplementary heat requirements for the water tower and distribution lines. This contributed to the idea of exploring ways to use the heat to warm existing buildings

LEFT Heating system at Yukon Honda. RIGHT Janne Hicklin receiving the ENERGY STAR® award on behalf of Yukon Development.



and to the related concepts of exploring a municipal heat distribution system serving the whole community, using the existing water lines as the distribution method.

Through a joint venture with the Haines Junction municipality, the Energy Solutions Centre has quantified the capacity of the aquifer to support an open loop heat pump system. It is also inventorying structures and their related energy consumption profiles throughout the community to determine which buildings may be suitable for retrofit, incorporating heating systems based on the contemplated geothermal system. Existing facilities under consideration include public buildings owned by the four levels of government, commercial structures such as motels and hotels, industrial buildings in the business park next to the well and a mix of single-family and small multi-family buildings.

Subject to step-by-step decisions by the joint venture, the next steps will be to:

- prepare the business case for converting buildings to this heat source,
- prepare a preliminary engineering report that takes the project to the schematic design stage for those applications that are identified in the business case as worth pursuing, and
- complete engineering design and installation of systems in selected existing buildings.

Vanier Catholic Secondary School ground source heat pump project: The Vanier school is located in the Riverdale neighbourhood of Whitehorse. It is a one-story, 5,600 m^2 building built in 1970, and is currently heated by a series of oil-fired boilers and a hot water circulation system. This project aims to reduce oil consumption annually by 146,250 litres, reducing CO_2e emissions by 415 tonnes (414 tonnes CO_2, under one tonne CH_4 and one tonne N_2O).

To date, a significant amount of feasibility work has been done on the Vanier site, including a hydrogeological investigation of the site, the design of conceptual options for the ground source heat pump system, and the development of the business case for the project.

LEFT Water flow from the well in Haines Junction. RIGHT Vanier school where a ground source heat pump feasibility study is underway.

Whitehorse Fish Hatchery: Since March 2003, the Yukon Energy-owned Whitehorse Fish Hatchery has had an operating ground source heat pump that utilizes the warm (being just under 6°C) water aquifer underneath the Riverdale subdivision. The water is pumped from a nearby well and circulated through the egg trays and fish tanks. An open loop, water-to-air heat pump was designed and installed to utilize the heat in the water before it is circulated through the fish tanks. To our knowledge, this is the first ground source heat pump application in the Yukon. It is used to heat the building and the water used by the hatchery fish in the winter, and to cool the water used by the fish in the summer, in order to maintain a slow and consistent growth rate for the fish.

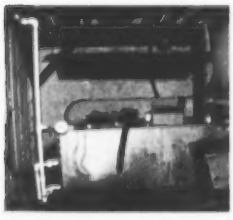
For many years, the hatchery was heated with a propane heating system. The heat pump has displaced the use of the propane and its associated greenhouse gas emissions. The table below shows what these emissions have been since 1999 when tracking of propane consumption began.

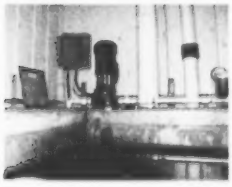
Whitehorse Rapids Fish Hatchery, tonnes of CO_2e emissions from propane heating.

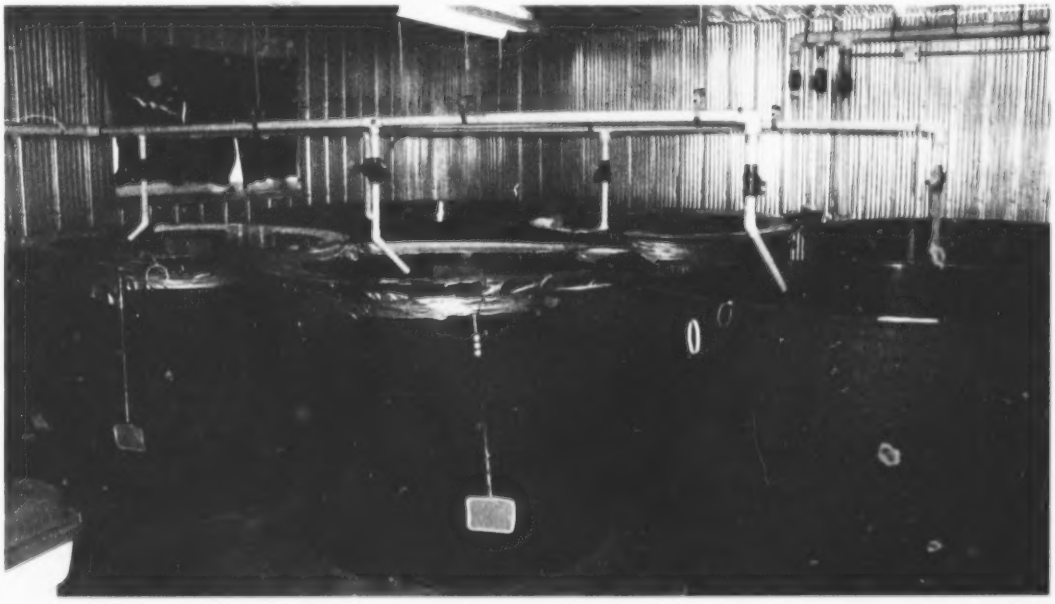
Year	CO_2	CH_4	N_2O	Total emissions
1999 (partial year)	5	0	0	5
2000	17	0	0	17
2001	14	0	0	14
2002	6	0	0	6
2003 (up to Oct. 2003)	1	0	0	1

The propane heating system now serves only as a backup heating source. An additional benefit of installing the heat pump is that the power used for the heat pump is purchased at the relatively inexpensive "secondary sales" rate. Not only is Yukon Energy displacing propane emissions, but the electrical power for the heat pump is also being generated with water that would otherwise be spilled. The staff at the hatchery reports that the building is now a more comfortable place to work.

The heat pump at Whitehorse Rapids Fish Hatchery.







Ricky's All Day Grill, a national franchise being built to more northern standards.

• **Green Building Design and Support Service**
indirect emission reduction

The Energy Solutions Centre's Green Building Design and Support Service promotes the economic and environmental benefits of green or high performance structures, and encourages local architects, engineers and aligned professions to use a more comprehensive approach to achieve green building design. This year, the service was involved in highly targeted public education and outreach, offering developers project-specific advice, technical support and planning assistance.

Over the past year, the service's project list has included eight commercial facilities, four light industrial structures, eight new institutional buildings, and a proposed subdivision. Perhaps the most notable project is a new Whitehorse restaurant developed by a national franchise that is expected to meet the criteria of the Commercial Building Incentive Program. To date, the Yukon Energy offices and the J.V. Clark School in Mayo are the only other buildings in the territory to meet these standards. The service is also actively participating in the development of the athlete's village for the Canada Winter Games to be held in Whitehorse in 2007.

The centre has also commissioned a study on the energy performance of new and renovated buildings across the Yukon, using a representative sample of buildings constructed over the last 10 years. Early indications show that, with few exceptions, these facilities are performing poorly. The study is being used to determine the need for energy performance standards for commercial buildings in the Yukon. The preliminary analysis of the data is in progress and includes an evaluation of what the greenhouse gas emissions from the buildings are, compared to what they would have been if they had been built to Model National Energy Code or Commercial Building Incentive Program standards.

• **First Nation Energy Management Service**
indirect emission reduction, renewable energy system emission reduction

In 2002, the Energy Solutions Centre continued to offer the First Nation Energy Management Service to help the Yukon's aboriginal communities develop and implement local energy initiatives. Substantial opportunities exist for improving the energy performance of First Nation building stock, and thereby lowering operating costs and reducing greenhouse gas emissions. There is also a need to identify and assess the long-term potential of renewable energy sources in or near aboriginal communities that depend on diesel-generated electricity.

The service recognizes that tackling these challenges means respecting the cultural differences and way of life within each aboriginal community. For this reason, the centre's First Nation energy technician expends considerable effort working with Yukon First Nations' leadership to promote, design, coordinate and facilitate the delivery of integrated energy solutions. The service will help to enhance local technical capacity over time so building energy management improves, and to improve the uptake of federal and territorial energy programs by First Nation communities. It is hoped that these activities will also lead to joint energy ventures between aboriginal governments and other governments, as well as with the private sector.

Some of the community initiatives in 2002 included a continuation of the feasibility studies of wind projects with the Kluane First Nation and the Champagne and Aishihik First Nations; the commencement of a wind monitoring project with the Northern Tutchone Council; discussions and/or planning for micro-hydro assessments with the Kluane First Nation, the Selkirk First Nation and the Carcross-Tagish First Nation; the continuation of the heat pump education and community energy planning with the three Northern Tutchone First Nations; and exhibits and presentations at First Nation, community and youth career fairs and science camps and First Nation general assemblies.

LEFT Wind monitoring installation in Old Crow. RIGHT First Nations students at science camp near Aishihik Lake.

As well, the First Nation of Nacho Nyak Dun has invited the Energy Solutions Centre to be involved in planning their new subdivision and administration building in Mayo (including the assessment of heat pump options for both), as well as studying an alternative energy supply for the Ethel Lake cultural camp.

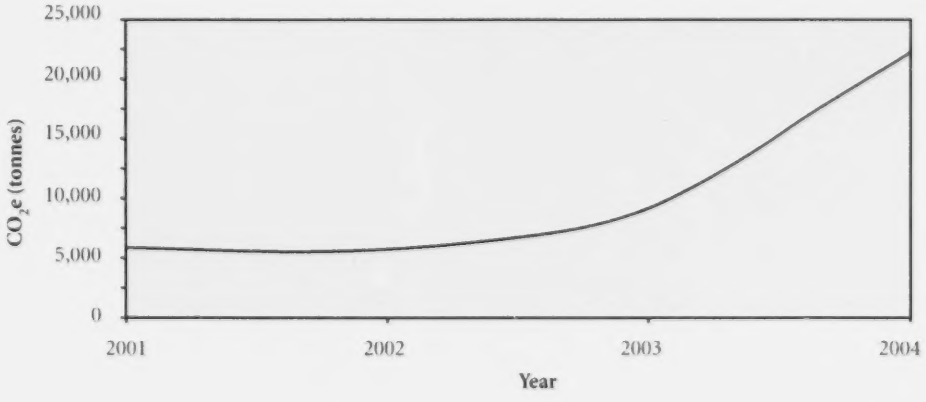
Summary

Yukon Development, Yukon Energy and the Energy Solutions Centre have several ongoing greenhouse gas reducing initiatives that we report on in each year's submission to the VCR. The table below provides a quick update on each of these projects, and where available, their associated greenhouse gases reductions, which are based on the actual amount of displaced fossil fuels. The graph below shows the cumulative impact that the companies' programs are having on greenhouse gas emissions in the Yukon.

Update on indirect and renewable energy systems emissions reduction projects.

Indirect emissions reductions	
Residential Energy Management Program	Program in its sixth year. Reduction of 199 tonnes CO_2e annually (198 tonnes CO_2, under 1 tonne CH_4 and 1 tonne N_2O)
House Calls Energy Efficiency Program	Program continues to reduce approximately 1,845 tonnes of CO_2e annually and new house calls are still being made.
Domestic Hot Water Timer Project	Three-year research pilot in its third year. Evaluation has been initiated.
Parking Lot Timer Project	Three-year research pilot in its third year. Evaluation has been initiated.
Comprehensive Efficiency and Renewable Energy Audits	Seventeen commercial audits have been completed since the program's inception in 2001. The Energy Solutions Centre is continuing to promote audits to the Yukon's commercial sector.
Renewable energy systems emissions reductions	
Commercial and Community Wind Resource Assessment Program	Eight commercial-scale sites and five household-scale sites monitored through 2002-2003. Commercial wind turbines currently provide enough electricity to displace 350,000 litres per year of diesel fuel used in electricity generation. This is equivalent to a 994-tonne CO_2e reduction (991 tonnes CO_2, under 1 tonne CH_4 and 3 tonnes N_2O). Five new household-scale sites are set up for monitoring each year and the five sites from the previous year are decommissioned and analyzed each year.
Rural Electrification Program	Applications for network connections and alternative renewable technologies are accepted. So far, most of the alternative technology applications have been for solar power. A Yukon Municipal Rural Electrification Program is anticipated following the signing of the Yukon Municipal Energy Solutions Partnership Memorandum of Understanding in June 2003.
Portable Solar Hybrid Unit Demonstration Project	This unit continues to be used around the Yukon. Most often, the power supply is used to operate concessions. Venues for summer 2003 were the Selkirk First Nation General Assembly (Pelly Crossing), the 24-hour bike relay, Yukon International Storytelling Festival, Klondike Harvest Fair and Canada Day celebrations (Whitehorse), the Atlin Music Festival, and the Council of Yukon First Nations' General Assembly in Carcross.

Cumulative tonnes CO_2e reduced in the Yukon through initiatives (actual and estimated) by Yukon Development, Energy Solutions Centre and Yukon Energy. See page 19 and Appendix B: 1 for explanations.



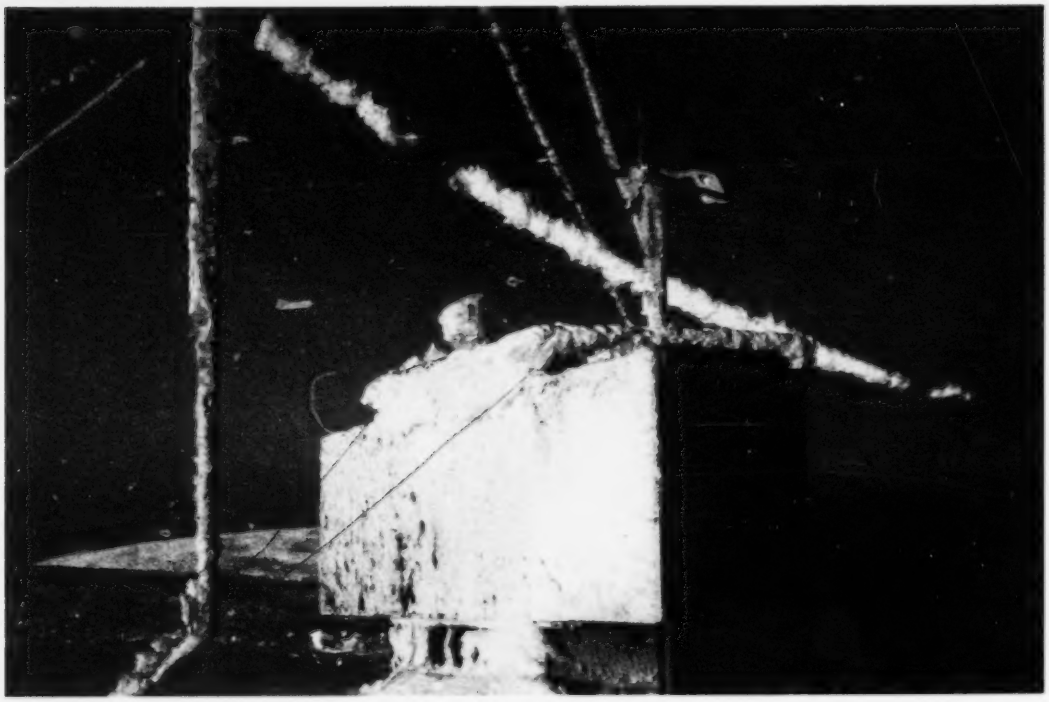
Verification

All the historic and current year greenhouse gas emissions relating to electricity production, space heating and fleet vehicle use for Yukon Development, Energy Solutions Centre and Yukon Energy are calculated directly from the quantity of diesel, heating fuel and gasoline consumed. This information is readily available from Yukon Energy's system control and accounting systems and the Yukon Development and Energy Solutions Centre accounting department. Our emissions relating to air travel are calculated using a trip record compiled from invoices, which are also readily available from the companies.

The greenhouse gas emission reductions are calculated directly from heating fuel displaced by our renewable energy and energy efficiency programs. This information is available from Yukon Development and Energy Solutions Centre records.

The calculations done for the greenhouse gas estimates in this report are included in Appendix A and Appendix B and show that, with access to the original data, the documented results can be replicated.

As well, Yukon Energy and Yukon Development have a verification procedure for the greenhouse gas emissions reductions expected as a result of the Mayo to Dawson City transmission line. The arrangement was developed with the benefit of an expert third-party life cycle value assessment conducted prior to the decision to proceed with the project, which included a prospective assessment of the quality of the emission credits based on criteria developed nationally. Because the transmission line is displacing diesel generation on an isolated power system, verification will not be a complicated process. As part of a draft template sale agreement, the emission credits will be verified by a third



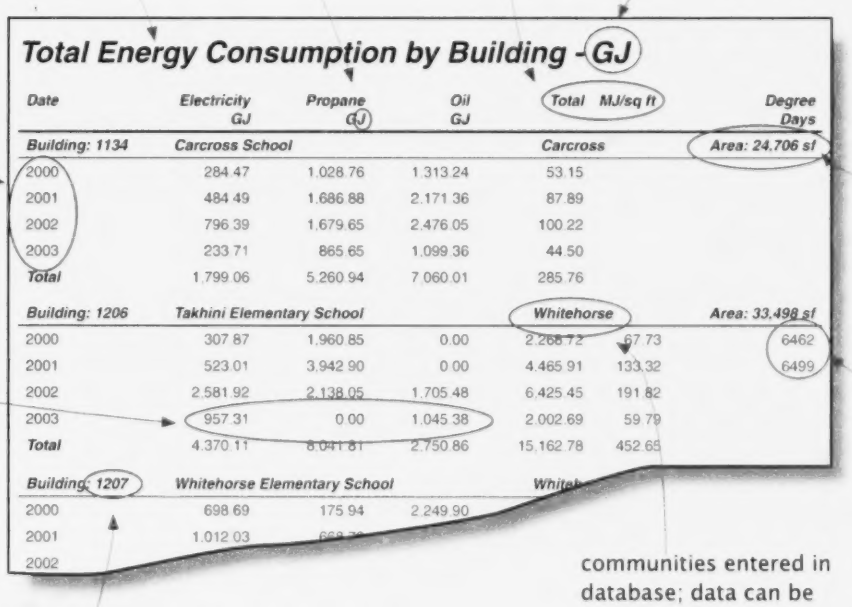
Rime ice on solar panel and wind monitoring instruments at Mount Sumanik.

party. Now that the transmission line is operating, the credits can be based on actual diesel displaced.

In 2002, the emission credits from the transmission line project were packaged into a prospectus and targeted to a select group of Canadian energy companies. This resulted in negotiations commencing with a western Canadian utility. These discussions ended after an impasse was reached and the market value of the credits increased due to Canada signing the Kyoto accord.

We are continuing to add years of data to, and improve on, the Public Buildings Energy Tracking System to help us verify the impact of our greenhouse gas reduction initiatives. The database now contains the total energy consumption for all 523 Yukon government buildings, plus 288 public housing buildings, for periods of one to three years. One of the purposes of the database is to provide base-line data on the electrical and heating fuel consumption of public buildings that are implementing integrated energy solutions through such services as the Renewable Power Sales Incentive Program. Next, the tracking system will be extended to municipal governments across the territory.

Sample data from the Public Buildings Energy Tracking System.



Total Energy Consumption by Building - GJ

Date	Electricity GJ	Propane GJ	Oil GJ	Total MJ/sq ft	Degree Days
Building: 1134	Carcross School			Carcross	Area: 24,706 sf
2000	284.47	1,028.76	1,313.24	53.15	
2001	484.49	1,686.88	2,171.36	87.89	
2002	796.39	1,679.65	2,476.05	100.22	
2003	233.71	865.65	1,099.36	44.50	
Total	1,799.06	5,260.94	7,060.01	285.76	
Building: 1206	Takhini Elementary School			Whitehorse	Area: 33,498 sf
2000	307.87	1,960.85	0.00	2,268.72	67.73	6462
2001	523.01	3,942.90	0.00	4,465.91	133.32	6499
2002	2,581.92	2,138.05	1,705.48	6,425.45	191.82	
2003	957.31	0.00	1,045.38	2,002.69	59.79	
Total	4,370.11	8,041.81	2,750.86	15,162.78	452.66	
Building: 1207	Whitehorse Elementary School			Whiteh	
2000	698.69	175.94	2,249.90		
2001	1,012.03				
2002					

title of report; other reports can be generated

a joule is the energy content of any fuel

megajoules per square foot; allows comparisons across different buildings

gigajoules; can also report in units of dollars, litres and kWhs

can also list by month; project is on-going and data will be updated annually

square foot; total floor area

degree days (unit for measuring how cold it has been over a 24-hour period) allow more accurate analysis across years and communities

quantity of each kind of fuel or electricity consumed in heating or powering a building

communities entered in database; data can be sorted by community or building owner

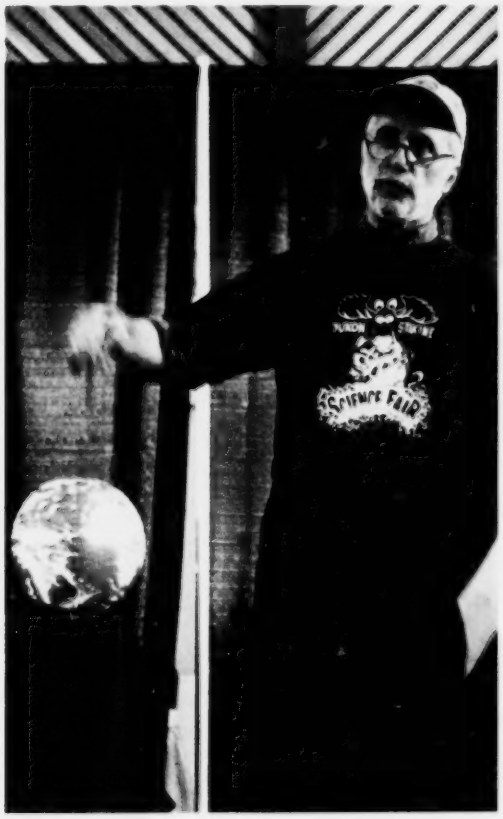
property management agency number, assigned by Yukon government

Yukon Development's climate change responsibilities

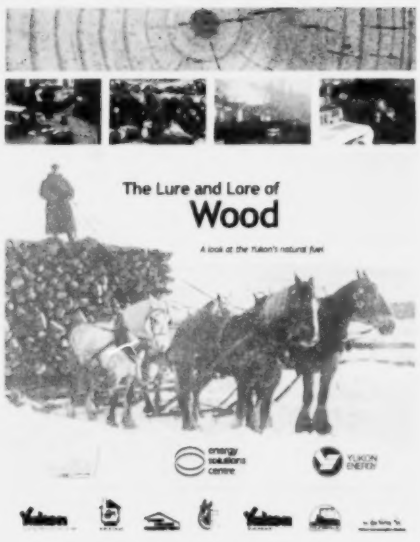
...to Yukoners

Yukon Development Corporation has a commitment to its shareholder, the Yukon government, and by extension, to the people of the Yukon, to provide the best priced, integrated energy solutions and services for Yukon consumers in the most environmentally and socially responsible manner. This includes contributing to the Yukon's climate change goals by providing programs and services that help to reduce greenhouse gas emissions.

To this end, over the past year, the Energy Solutions Centre continued to play an active role in the community, working with a range of different organizations. In November, the centre co-hosted the second annual Yukon Energy Fair with the Northern Climate ExChange, Yukon Development and Yukon Energy. More than 30 exhibitors showcased the latest energy-saving and renewable energy technology. The keynote speaker at the fair was Jay Ingram, author and host on the Discovery Channel. Staff of Science World B.C. was also on hand to perform practical, fun experiments that demonstrated various scientific properties for students. The fair was held at the same time as the annual Yukon/ Stikine Science Fair, co-sponsored by Innovators in the Schools, Yukon College and the territorial government. The 2003 Energy Fair, planned for December 5-6, will feature keynote speaker, David Suzuki.



Promotion for the Yukon's energy fair and science fair, 2002, which featured Jay Ingram (right).



The Energy Solutions Centre was a major participant in the 2003 Yukon-wide Lions trade show in Whitehorse, with four staffed booths promoting energy efficiency and renewable energy solutions for Yukoners.

The centre also co-released two new energy publications in 2002 and one in 2003, "PeoplePower," "The Lure and Lore of Wood" and "Pushing the Envelope." Other outreach activities included media interviews and the distribution of program brochures, news releases, and progress updates on specific initiatives.

The storefront location of the Energy Solutions Centre has proven its value. Located in downtown Whitehorse, the ground floor offices are highly visible and encourage walk-in clientele. But the centre's commitment to greenhouse gas reductions through energy conservation is apparent even before walking in the front door. A SOLARWALL® has been installed on the south side of the building, and the Centre's Toyota Prius is the second hybrid vehicle to be tested in the Yukon.

Some of the other energy saving measures at the office are less obvious. These include a thermostat timer that reduces heat use and a motion sensor light that decreases power consumption in the office equipment room. Through Yukon Development's Renewable Power Sales Incentive Program, the centre arranged for the landlord to install an electric boiler and use surplus hydroelectricity rather than fossil fuels to heat the building. This change reduces greenhouse gas emissions and saves money for the property owner since the surplus hydroelectricity costs less than propane or oil.

Some of the resources available at the Energy Solutions Centre office.

An extensive resource library located in the foyer is open to the public. It contains information about federal and territorial energy initiatives, efficiency and renewable energy technologies, and climate change. A computer with high-speed internet

access assists with information searches and the Energy Solutions Centre website (www.nrgsc.yk.ca) offers material on programs and services, and helpful links to other energy resources. The centre's website continues to be updated with new publications and news about coming events.

This year, centre staff worked with the City of Whitehorse on its Local Action Plan to reduce greenhouse gas emissions and assisted in the Yukon government's work with the Government of Canada's domestic reporting system.

... to Yukon trades people and building professionals

In 2002, the centre offered courses that introduced new energy efficiency and renewable energy technologies to the Yukon, and improved the capability of the private sector to design and install these integrated energy solutions. Courses were set up to meet specific market needs, develop skills within a particular field, or complement initiatives of the centre. Architects, engineers, building and environmental regulators, facility owners, contractors, appliance and energy technology retailers, as well as trades people, all benefited from the hands-on training, which showed them the link between their work and climate change, and enhanced their marketability and competitiveness.

The centre ensured that all training resulted in certification recognized nationally or by a specific industry. This guarantees that consumers can count on a significant level of expertise from their service person and may help lead to informal or formal standards within the local market.

Attending a course about new heat pump technology.

... to our suppliers

Yukon Energy, Yukon Development and the Energy Solutions Centre recognize that they can have a significant impact on the way their suppliers do business, and thus, on their suppliers' greenhouse gas emissions. That is why Yukon Development and the Energy Solutions Centre have purchased locally made furniture for our offices. It is also the reason we have partnered with the Klondike Snowmobile Association to promote, and shift the market towards the purchase and use of, more fuel efficient four-cycle snow machines and outboard motors. As well, Yukon Energy has a long standing policy of purchasing the lowest sulphur fuel for its diesel generators.

...and to our employees

The majority of projects that the staffs of both the Energy Solutions Centre and Yukon Development are involved with have greenhouse gas reduction as one of their central themes. This is in keeping with our mandate and business plan objectives and means that staff are not only aware of the issues surrounding greenhouse gas emissions, but are also on the front lines, educating the public and private sector on the issues. On a day-to-day, office level, consultants and employees are encouraged to conserve electricity by optimizing natural light, minimizing the need for lighting in unoccupied areas and turning off computers and other office equipment not in use. There is a well-established recycling program within the companies, and both e-work and bike commuting are actively supported.

At Yukon Energy, staff members have also become aware of climate change and how to reduce greenhouse gas emissions through their in-house environmental training. This year, the Yukon Energy Employee newsletter has started running articles on how staff can help reduce greenhouse gas emissions at work and at home.

Appendix A

Appendix A: 1. Greenhouse gas emissions from Yukon Energy's diesel generators (1990-2002)

Appendix A: 2. Greenhouse gas emissions from Yukon Energy's corporate building space heating (2000-2002)

Appendix A: 3. Greenhouse gas emissions from Yukon Energy, Yukon Development and Energy Solutions Centre vehicle usage (2000-2002)

Appendix A: 4. Greenhouse gas emissions from fish hatchery heaters (1999-2003)

• APPENDIX A: 1. Greenhouse gas emissions from Yukon Energy's diesel generators (1990-2002)

1990	FUEL		EMISSIONS		
Month	Type of diesel fuel	Quantity of fuel in litres	CO_2 (g) Emission factor Heavy=3090 g/l Light=2830 g/l	CH_4 (g) Emission factor Heavy=0.12 g/l Light=0.006 g/l	N_2O (g) Emission factor Heavy=0.013 g/l Light=0.013 g/l
January	Light	867,160	2,454,062,800	5,202.96	11,273
February	Light	1,520,528	4,303,094,240	9,123.17	19,767
March	Light	885,289	2,505,367,870	5,311.73	11,509
April	Heavy	440,460	1,361,021,400	52,855.20	5,726
May	Heavy	410,121	1,267,273,890	49,214.52	5,332
June	Heavy	305,347	943,522,230	36,641.64	3,970
July	Heavy	287,481	888,316,290	34,497.72	3,737
August	Heavy	294,594	910,295,460	35,351.28	3,830
September	Heavy	735,434	2,272,491,060	88,252.08	9,561
October	Heavy	622,752	1,924,303,680	74,730.24	8,096
November	Light	2,146,627	6,074,954,410	12,879.76	27,906
December	Light	3,532,877	9,998,041,910	21,197.26	45,927
Total		**12,048,670**	**34,902,745,240**	**425,258**	**156,633**

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	8,930,409	8,930	**9**	0
N_2O*310	48,556,140	48,556	**49**	0
CO_2*1	34,902,745,240	34,902,745	**34,903**	35
Total CO_2e	34,960,231,789	34,960,232	**34,960**	35

Emissions intensity	GWh	t CO_2e/GWh
Diesel generation	44	795
Total generation	457	76

1991	FUEL		EMISSIONS		
Month	Type of diesel fuel	Quantity of fuel in litres	CO_2 (g) Emission factor Heavy=3090 g/l Light=2830 g/l	CH_4 (g) Emission factor Heavy=0.12 g/l Light=0.006 g/l	N_2O (g) Emission factor Heavy=0.013 g/l Light=0.013 g/l
January	Light	2,493,636	7,056,989,880	14,961.82	32,417
February	Light	1,309,993	3,707,280,190	7,859.96	17,030
March	Light	1,560,179	4,415,306,570	9,361.07	20,282
April	Heavy	461,892	1,427,246,280	55,427.04	6,005
May	Heavy	305,264	943,265,760	36,631.68	3,968
June	Heavy	277,059	856,112,310	33,247.08	3,602
July	Heavy	534,023	1,650,131,070	64,082.76	6,942
August	Heavy	361,331	1,116,512,790	43,359.72	4,697
September	Heavy	311,329	962,006,610	37,359.48	4,047
October	Heavy	438,512	1,355,002,080	52,621.44	5,701
November	Light	651,923	1,844,942,090	3,911.54	8,475
December	Light	1,129,517	3,196,533,110	6,777.10	14,684
Total		**9,834,658**	**28,531,328,740**	**365,601**	**127,851**

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	7,677,614	7,678	**8**	0
N_2O*310	39,633,672	39,634	**40**	0
CO_2*1	28,531,328,740	28,531,329	**28,531**	29
Total CO_2e	28,578,640,026	28,578,640	**28,579**	29

Emissions intensity	GWh	t CO_2e/GWh
Diesel generation	35	817
Total generation	430	66

• APPENDIX A: 1. Greenhouse gas emissions from Yukon Energy's diesel generators (1990-2002)

1992	FUEL		EMISSIONS		
Month	Type of diesel fuel	Quantity of fuel in litres	CO_2 (g) Emission factor Heavy=3090 g/l Light=2830 g/l	CH_4 (g) Emission factor Heavy=0.12 g/l Light=0.006 g/l	N_2O (g) Emission factor Heavy=0.013 g/l Light=0.013 g/l
January	Light	1,100,792	3,115,241,360	6,604.75	14,310
February	Light	1,111,906	3,146,693,980	6,671.44	14,455
March	Light	1,482,610	4,195,786,300	8,895.66	19,274
April	Heavy	371,807	1,148,883,630	44,616.84	4,833
May	Heavy	576,393	1,781,054,370	69,167.16	7,493
June	Heavy	489,328	1,512,023,520	58,719.36	6,361
July	Heavy	647,786	2,001,658,740	77,734.32	8,421
August	Heavy	585,674	1,809,732,660	70,280.88	7,614
September	Heavy	867,831	2,681,597,790	104,139.72	11,282
October	Heavy	1,945,107	6,010,380,630	233,412.84	25,286
November	Light	1,454,746	4,116,931,180	8,728.48	18,912
December	Light	1,473,993	4,171,400,190	8,843.96	19,162
Total		**12,107,973**	**35,691,384,350**	**697,815**	**157,404**

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	14,654,123	14,654	**15**	0
N_2O*310	48,795,131	48,795	**49**	0
CO_2*1	35,691,384,350	35,691,384	**35,691**	36
Total CO_2e	35,754,833,605	35,754,834	**35,755**	36

Emissions intensity	GWh	t CO_2e/GWh
Diesel generation	46	777
Total generation	456	78

1993	FUEL		EMISSIONS		
Month	Type of diesel fuel	Quantity of fuel in litres	CO_2 (g) Emission factor Heavy=3090 g/l Light=2830 g/l	CH_4 (g) Emission factor Heavy=0.12 g/l Light=0.006 g/l	N_2O (g) Emission factor Heavy=0.013 g/l Light=0.013 g/l
January	Light	1,660,524	4,699,282,920	9,963.14	21,587
February	Light	1,770,200	5,009,666,000	10,621.20	23,013
March	Light	1,479,777	4,187,768,910	8,878.66	19,237
April	Heavy	409,345	1,264,876,050	49,121.40	5,321
May	Heavy	254,082	785,113,380	30,489.84	3,303
June	Heavy	274,358	847,766,220	32,922.96	3,567
July	Heavy	286,405	884,991,450	34,368.60	3,723
August	Heavy	285,293	881,555,370	34,235.16	3,709
September	Heavy	275,060	849,935,400	33,007.20	3,576
October	Heavy	247,264	764,045,760	29,671.68	3,214
November	Light	269,028	761,349,240	1,614.17	3,497
December	Light	330,632	935,688,560	1,983.79	4,298
Total		**7,541,968**	**21,872,039,260**	**276,878**	**98,046**

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	5,814,434	5,814	**6**	0
N_2O*310	30,394,131	30,394	**30**	0
CO_2*1	21,872,039,260	21,872,039	**21,872**	22
Total CO_2e	21,908,247,825	21,908,248	**21,908**	22

Emissions intensity	GWh	t CO_2e/GWh
Diesel generation	28	782
Total generation	308	71

• APPENDIX A: 1. Greenhouse gas emissions from Yukon Energy's diesel generators (1990-2002)

1994	FUEL		EMISSIONS		
Month	Type of diesel fuel	Quantity of fuel in litres	CO_2 (g) Emission factor Heavy=3090 g/l Light=2830 g/l	CH_4 (g) Emission factor Heavy=0.12 g/l Light=0.006 g/l	N_2O (g) Emission factor Heavy=0.013 g/l Light=0.013 g/l
January	Light	320,706	907,597,980	1,924.24	4,169
February	Light	324,810	919,212,300	1,948.86	4,223
March	Light	258,795	732,389,850	1,552.77	3,364
April	Heavy	256,431	792,371,790	30,771.72	3,334
May	Heavy	263,618	814,579,620	31,634.16	3,427
June	Heavy	292,834	904,857,060	35,140.08	3,807
July	Heavy	293,625	907,301,250	35,235	3,817
August	Heavy	308,105	952,044,450	36,972.60	4,005
September	Heavy	304,933	942,242,970	36,591.96	3,964
October	Heavy	258,562	798,956,580	31,027.44	3,361
November	Light	339,301	960,221,830	2,035.81	4,411
December	Light	326,849	924,982,670	1,961.09	4,249
Total		**3,548,569**	**10,556,758,350**	**246,796**	**46,131**

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	5,182,710	5,183	**5**	0
N_2O*310	14,300,733	14,301	**14**	0
CO_2*1	10,556,758,350	10,556,758	**10,557**	11
Total CO_2e	10,576,241,793	10,576,242	**10,576**	11

Emissions intensity	GWh	t CO_2e/GWh
Diesel generation	14	755
Total generation	263	40

1995	FUEL		EMISSIONS		
Month	Type of diesel fuel	Quantity of fuel in litres	CO_2 (g) Emission factor Heavy=3090 g/l Light=2830 g/l	CH_4 (g) Emission factor Heavy=0.12 g/l Light=0.006 g/l	N_2O (g) Emission factor Heavy=0.013 g/l Light=0.013 g/l
January	Light	374,275	1,059,198,250	2,245.65	4,866
February	Light	312,573	884,581,590	1,875.44	4,063
March	Light	276,730	783,145,900	1,660.38	3,597
April	Heavy	253,866	784,445,940	30,463.92	3,300
May	Heavy	256,250	791,812,500	30,750	3,331
June	Heavy	293,431	906,701,790	35,211.72	3,815
July	Heavy	383,846	1,186,084,140	46,061.52	4,990
August	Heavy	805,651	2,489,461,590	96,678.12	10,473
September	Heavy	915,458	2,828,765,220	109,854.96	11,901
October	Heavy	1,407,354	4,348,723,860	168,882.48	18,296
November	Light	3,625,079	10,258,973,570	21,750.47	47,126
December	Light	4,855,561	13,741,237,630	29,133.37	63,122
Total		**13,760,074**	**40,063,131,980**	**574,568**	**178,881**

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	12,065,929	12,066	**12**	0
N_2O*310	55,453,098	55,453	**55**	0
CO_2*1	40,063,131,980	40,063,132	**40,063**	40
Total CO_2e	40,130,651,007	40,130,651	**40,131**	40

Emissions intensity	GWh	t CO_2e/GWh
Diesel generation	53	757
Total generation	363	111

• APPENDIX A: 1. Greenhouse gas emissions from Yukon Energy's diesel generators (1990-2002)

1996	FUEL		EMISSIONS		
Month	Type of diesel fuel	Quantity of fuel in litres	CO_2 (g) Emission factor Heavy=3090 g/l Light=2830 g/l	CH_4 (g) Emission factor Heavy=0.12 g/l Light=0.006 g/l	N_2O (g) Emission factor Heavy=0.013 g/l Light=0.013 g/l
January	Light	4,829,176	13,666,568,080	28,975.06	62,779
February	Light	2,220,558	6,284,179,140	13,323.35	28,867
March	Light	1,777,121	5,029,252,430	10,662.73	23,103
April	Heavy	1,852,142	5,723,118,780	222,257.04	24,078
May	Heavy	2,118,178	6,545,170,020	254,181.36	27,536
June	Heavy	2,365,406	7,309,104,540	283,848.72	30,750
July	Heavy	1,558,079	4,814,464,110	186,969.48	20,255
August	Heavy	1,158,814	3,580,735,260	139,057.68	15,065
September	Heavy	1,017,274	3,143,376,660	122,072.88	13,225
October	Heavy	2,865,608	8,854,728,720	343,872.96	37,253
November	Light	4,809,272	13,610,239,760	28,855.63	62,521
December	Light	4,156,568	11,763,087,440	24,939.41	54,035
Total		**30,728,196**	**90,324,024,940**	**1,659,016**	**399,467**

CO_2e	grams	kilograms	**tonnes**	mega tonnes
CH_4 * 21	34,839,342	34,839	**35**	0
N_2O * 310	123,834,630	123,835	**124**	0
CO_2 * 1	90,324,024,940	90,324,025	**90,324**	90
Total CO_2e	90,482,698,912	90,482,699	**90,483**	90

Emissions intensity	GWh	t CO_2e/GWh
Diesel generation	118	767
Total generation	473	191

1997	FUEL		EMISSIONS		
Month	Type of diesel fuel	Quantity of fuel in litres	CO_2 (g) Emission factor Heavy=3090 g/l Light=2830 g/l	CH_4 (g) Emission factor Heavy=0.12 g/l Light=0.006 g/l	N_2O (g) Emission factor Heavy=0.013 g/l Light=0.013 g/l
January	Light	5,555,592	15,722,325,360	33,333.55	72,223
February	Light	4,995,874	14,138,323,420	29,975.24	64,946
March	Light	5,850,661	16,557,370,630	35,103.97	76,059
April	Heavy	2,035,797	6,290,612,730	244,295.64	26,465
May	Heavy	677,457	2,093,342,130	81,294.84	8,807
June	Heavy	320,396	990,023,640	38,447.52	4,165
July	Heavy	337,931	1,044,206,790	40,551.72	4,393
August	Heavy	339,771	1,049,892,390	40,772.52	4,417
September	Heavy	349,869	1,081,095,210	41,984.28	4,548
October	Heavy	305,342	943,506,780	36,641.04	3,969
November	Light	2,224,035	6,294,019,050	13,344.21	28,912
December	Light	2,080,330	5,887,333,900	12,481.98	27,044
Total		**25,073,055**	**72,092,052,030**	**648,227**	**325,950**

CO_2e	grams	kilograms	**tonnes**	mega tonnes
CH_4 * 21	13,612,757	13,613	**14**	0
N_2O * 310	101,044,412	101,044	**101**	0
CO_2 * 1	72,092,052,030	72,092,052	**72,092**	72
Total CO_2e	72,206,709,198	72,206,709	**72,207**	72

Emissions intensity	GWh	t CO_2e/GWh
Diesel generation	96	752
Total generation	349	207

• APPENDIX A: 1. Greenhouse gas emissions from Yukon Energy's diesel generators (1990-2002)

1998	FUEL		EMISSIONS		
Month	Type of diesel fuel	Quantity of fuel in litres	CO_2 (g) Emission factor Heavy=3090 g/l Light=2830 g/l	CH_4 (g) Emission factor Heavy=0.12 g/l Light=0.006 g/l	N_2O (g) Emission factor Heavy=0.013 g/l Light=0.013 g/l
January	Light	2,088,355	5,910,044,650	12,530.13	27,149
February	Light	367,586	1,040,268,380	2,205.52	4,779
March	Light	331,687	938,674,210	1,990.12	4,312
April	Heavy	267,542	826,704,780	32,105.04	3,478
May	Heavy	277,800	858,402,000	33,336	3,611
June	Heavy	348,098	1,075,622,820	41,771.76	4,525
July	Heavy	511,773	1,581,378,570	61,412.76	6,653
August	Heavy	341,515	1,055,281,350	40,981.80	4,440
September	Heavy	312,020	964,141,800	37,442.40	4,056
October	Heavy	312,623	966,005,070	37,514.76	4,064
November	Light	321,468	909,754,440	1,928.81	4,179
December	Light	360,426	1,020,005,580	2,162.56	4,686
Total		**5,840,893**	**17,146,283,650**	**305,382**	**75,932**

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	6,413,015	6,413	**6**	0
N_2O*310	23,538,799	23,539	**24**	0
CO_2*1	17,146,283,650	17,146,284	**17,146**	17
Total CO_2e	17,176,235,463	17,176,235	**17,176**	17

Emissions intensity	GWh	t CO_2e/GWh
Diesel generation	22	781
Total generation	287	60

1999	FUEL		EMISSIONS		
Month	Type of diesel fuel	Quantity of fuel in litres	CO_2 (g) Emission factor Heavy=3090 g/l Light=2830 g/l	CH_4 (g) Emission factor Heavy=0.12 g/l Light=0.006 g/l	N_2O (g) Emission factor Heavy=0.013 g/l Light=0.013 g/l
January	Light	1,474,892	4,173,944,360	8,849.35	19,174
February	Light	1,068,422	3,023,634,260	6,410.53	13,889
March	Light	353,636	1,000,789,880	2,121.82	4,597
April	Heavy	803,353	2,482,360,770	96,402.36	10,444
May	Heavy	840,822	2,598,139,980	100,898.64	10,931
June	Heavy	336,386	1,039,432,740	40,366.32	4,373
July	Heavy	341,115	1,054,045,350	40,933.80	4,434
August	Heavy	398,472	1,231,278,480	47,816.64	5,180
September	Heavy	371,344	1,147,452,960	44,561.28	4,827
October	Heavy	309,945	957,730,050	37,193.40	4,029
November	Light	507,425	1,436,012,750	3,044.55	6,597
December	Light	465,693	1,317,911,190	2,794.16	6,054
Total		**7,271,505**	**21,462,732,770**	**431,393**	**94,530**

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	9,059,250	9,059	**9**	0
N_2O*310	29,304,165	29,304	**29**	0
CO_2*1	21,462,732,770	21,462,733	**21,463**	21
Total CO_2e	21,501,096,185	21,501,096	**21,501**	22

Emissions intensity	GWh	t CO_2e/GWh
Diesel generation	27	796
Total generation	270	80

• APPENDIX A: 1. Greenhouse gas emissions from Yukon Energy's diesel generators (1990-2002)

2000	FUEL		EMISSIONS		
Month	Type of diesel fuel	Quantity of fuel in litres	CO_2 (g) Emission factor Heavy=3090 g/l Light=2830 g/l	CH_4 (g) Emission factor Heavy=0.12 g/l Light=0.006 g/l	N_2O (g) Emission factor Heavy=0.013 g/l Light=0.013 g/l
January	Light	482,027	1,364,136,410	2,892.16	6,266
February	Light	323,721	916,130,430	1,942.33	4,208
March	Light	338,757	958,682,310	2,032.54	4,404
April	Heavy	301,077	930,327,930	36,129.24	3,914
May	Heavy	321,491	993,407,190	38,578.92	4,179
June	Heavy	340,080	1,050,847,200	40,809.60	4,421
July	Heavy	365,105	1,128,174,450	43,812.60	4,746
August	Heavy	368,865	1,139,792,850	44,263.80	4,795
September	Heavy	306,204	946,170,360	36,744.48	3,981
October	Heavy	331,309	1,023,744,810	39,757.08	4,307
November	Light	478,146	1,353,153,180	2,868.88	6,216
December	Light	396,229	1,121,328,070	2,377.37	5,151
Total		4,353,011	12,925,895,190	292,209	56,589

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	6,136,389	6,136	6	0
N_2O*310	17,542,634	17,543	18	0
CO_2*1	12,925,895,190	12,925,895	12,926	13
Total CO_2e	12,949,574,213	12,949,574	12,950	13

Emissions intensity	GWh	t CO_2e/GWh
Diesel generation	16	809
Total generation	268	48

2001	FUEL		EMISSIONS		
Month	Type of diesel fuel	Quantity of fuel in litres	CO_2 (g) Emission factor Heavy=3090 g/l Light=2830 g/l	CH_4 (g) Emission factor Heavy=0.12 g/l Light=0.006 g/l	N_2O (g) Emission factor Heavy=0.013 g/l Light=0.013 g/l
January	Light	362,694	1,026,424,020	2,176.16	4,715
February	Light	313,523	887,270,090	1,881.14	4,076
March	Light	356,748	1,009,596,840	2,140.49	4,638
April	Heavy	313,593	969,002,370	37,631.16	4,077
May	Heavy	313,653	969,187,770	37,638.36	4,077
June	Heavy	332,746	1,028,185,140	39,929.52	4,326
July	Heavy	346,555	1,070,854,950	41,586.60	4,505
August	Heavy	357,663	1,105,178,670	42,919.56	4,650
September	Heavy	328,722	1,015,750,980	39,446.64	4,273
October	Heavy	320,359	989,909,310	38,443.08	4,165
November	Light	337,449	954,980,670	2,024.69	4,387
December	Light	415,323	1,175,364,090	2,491.94	5,399
Total		4,099,028	12,201,704,900	288,309	53,287

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	6,054,496	6,054	6	0
N_2O*310	16,519,083	16,519	17	0
CO_2*1	12,201,704,900	12,201,705	12,202	12
Total CO_2e	12,224,278,479	12,224,278	12,224	12

Emissions intensity	GWh	t CO_2e/GWh
Diesel generation	15.1	810
Total generation	272.9	45

• APPENDIX A: 1. Greenhouse gas emissions from Yukon Energy's diesel generators (1990-2002)

2002	FUEL		EMISSIONS		
			CO_2 (g) Emission factor	CH_4 (g) Emission factor	N_2O (g) Emission factor
Month	Type of diesel fuel	Quantity of fuel in !itres	Light=2830 g/l	Light=0.006 g/l	Light=0.013 g/l
January	Oil #2 light distillate	326,327	923,505,410	1,957.96	4,242
February	Oil #2 light distillate	317,430	898,326,900	1,904.58	4,127
March	Oil #2 light distillate	328,792	930,481,360	1,972.75	4,274
April	Oil #2 light distillate	308,975	874,399,250	1,853.85	4,017
May	Oil #2 light distillate	324,559	918,501,970	1,947.35	4,219
June	Oil #2 light distillate	364,139	1,030,513,370	2,184.83	4,734
July	Oil #2 light distillate	436,756	1,236,019,480	2,620.54	5,678
August	Oil #2 light distillate	393,861	1,114,626,630	2,363.17	5,120
September	Oil #2 light distillate	320,456	906,890,480	1,922.74	4,166
October	Oil #2 light distillate	297,550	842,066,500	1,785.30	3,868
November	Oil #2 light distillate	308,232	872,296,560	1,849.39	4,007
December	Oil #2 light distillate	482,009	1,364,085,470	2,892.05	6,266
Total		**4,209,086**	**11,911,713,380**	**25,255**	**54,718**

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	530,345	530	**1**	0
N_2O*310	16,962,617	16,963	**17**	0
CO_2*1	11,911,713,380	11,911,713	**11,912**	12
Total CO_2e	11,929,206,341	11,929,206	**11,929**	12

Emissions intensity	GWh	t CO_2e/GWh
Diesel generation	16.18	737
Total generation	279.43	43

• APPENDIX A: 2. Greenhouse gas emissions from Yukon Energy's corporate building space heating (2000-2002)

2000	FUEL		EMISSIONS		
	Type of fuel	Quantity of fuel in litres (approximately)	CO_2 (g) Emission factor 2,830 g/l	CH_4 (g) Emission factor 0.026 g/l	N_2O (g) Emission factor 0.013 g/l
January to December	Heating fuel (light distillate oil)	69,390.60	196,375,398.00	1,804.16	902.08

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	37,887.27	38	0	0
N_2O*310	279,644	280	0	0
CO_2*1	196,375,398	196,375	196	0
Total CO_2e	196,692,929	196,693	197	0

2001	FUEL		EMISSIONS		
	Type of fuel	Quantity of fuel in litres (approximately)	CO_2 (g) Emission factor 2,830 g/l	CH_4 (g) Emission factor 0.026 g/l	N_2O (g) Emission factor 0.013 g/l
January to December	Heating fuel (light distillate oil)	24,325.94	68,842,410.20	632.47	316.24

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	13,281.96	13	0	0
N_2O*310	98,034	98	0	0
CO_2*1	68,842,410	68,842	69	0
Total CO_2e	68,953,726	68,954	69	0

2002	FUEL		EMISSIONS		
	Type of fuel	Quantity of oil fuel in litres (approximately)	CO_2 (g) Emission factor 2,830 g/l	CH_4 (g) Emission factor 0.26 g/l	N_2O (g) Emission factor 0.031 g/l
January to December	Heating fuel (light distillate oil)	29,790.92	84,308,313.55	774.56	923.52

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	16,265.84	16	0	0
N_2O*310	286,291	286	0	0
CO_2*1	84,308,314	84,308	84	0
Total CO_2e	84,610,870	84,611	85	0

- APPENDIX A: 3. Greenhouse gas emissions from Yukon Energy, Yukon Development and Energy Solutions Centre vehicle usage (2000-2002)

2000	FUEL		EMISSIONS		
	Type of fuel	Quantity of fuel in litres (approximately)	CO_2 (g) Emission factor 2,360 g/l	CH_4 (g) Emission factor 0.19 g/l	N_2O (g) Emission factor 0.39 g/l
January to December	Light truck (gasoline)	125,671.27	296,584,188.91	23,877.54	49,011.79

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	501,428.35	501	**1**	0
N_2O*310	15,193,656	15,194	**15**	0
CO_2*1	296,584,189	296,584	**297**	0
Total CO_2e	312,279,273	312,279	**312**	0

2001	FUEL		EMISSIONS		
	Type of fuel	Quantity of fuel in litres (approximately)	CO_2 (g) Emission factor 2,360 g/l	CH_4 (g) Emission factor 0.19 g/l	N_2O (g) Emission factor 0.39 g/l
January to December	Light truck (gasoline)	146,897.23	346,677,473.27	27,910.47	57,289.92

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	586,119.97	586	**1**	0
N_2O*310	17,759,876	17,760	**18**	0
CO_2*1	346,677,473	346,677	**347**	0
Total CO_2e	365,023,469	365,023	**365**	0

2002	FUEL		EMISSIONS		
	Type of fuel	Quantity of gasoline fuel in litres (approximately)	CO_2 (g) Emission factor 2,360 g/l 2,360 g/l	CH_4 (g) Emission factor 0.19 g/l 0.25 g/l	N_2O (g) Emission factor 0.41 g/l 0.26 g/l
January to December	Light truck (gasoline)	147,635.05	348,418,721.99	28,050.66	60,530.37
January to December	Car (gasoline)	611.69	1,443,588	152.92	159
Total		**148,246.74**	**349,862,310.39**	**28,203.58**	**60,689.41**

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	592,275.23	592	**1**	0
N_2O*310	18,813,717	18,814	**19**	0
CO_2*1	349,862,310	349,862	**350**	0
Total CO_2e	369,268,303	369,268	**369**	0

• APPENDIX A: 4. Greenhouse gas emissions from fish hatchery heaters (1999–2003)

1999	FUEL		EMISSIONS		
Month tank filled	Type of fuel	Quantity of propane fuel in litres (approximately)	CO_2 (g) Emission factor 1,500 g/l	CH_4 (g) Emission factor 0.24 g/l	N_2O (g) Emission factor 0.108 g/l
October	propane	1,221.54	1,832,308	293	131.93
December	propane	2,136	3,203,500	513	230.65
Total		**3,357.54**	**5,035,808**	**806**	**363**

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	16,920.31	17	**0**	0
N_2O*310	112,399	112	**0**	0
CO_2*1	5,035,808	5,036	**5**	0
Total CO_2e	5,165,127	5,165	**5**	0

2000	FUEL		EMISSIONS		
Month tank filled	Type of fuel	Quantity of propane fuel in litres (approximately)	CO_2 (g) Emission factor 1,500 g/l	CH_4 (g) Emission factor 0.24 g/l	N_2O (g) Emission factor 0.108 g/l
January	propane	1,300.00	1,950,000	312.00	140.40
February	propane	2,751.00	4,126,496	660.24	297.11
April	propane	1,198.99	1,798,490	287.76	129.49
May	propane	1,724.00	2,586,007	413.76	186.19
November	propane	2,950.00	4,425,000	708.00	318.60
December	propane	1,250.00	1,875,000	300.00	135.00
Total			**16,760,993**	**2,681.76**	**640**

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	56,316.94	56	**0**	0
N_2O*310	198,336	198	**0**	0
CO_2*1	16,760,993	16,761	**17**	0
Total CO_2e	17,015,645	17,016	**17**	0

2001	FUEL		EMISSIONS		
Month tank filled	Type of fuel	Quantity of propane fuel in litres (approximately)	CO_2 (g) Emission factor 1,500 g/l	CH_4 (g) Emission factor 0.24 g/l	N_2O (g) Emission factor 0.108 g/l
January	propane	1,351.00	2,026,500	324.24	145.91
March	propane	2,760.00	4,140,000	662.40	298.08
May	propane	2,208.00	3,312,000	529.92	238.46
June	propane	1,411.00	2,116,506	338.64	152.39
December	propane	1,634.21	2,451,308	392.21	176.49
Total			**14,046,314**	**2,247.41**	**329**

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	47,195.62	47	**0**	0
N_2O*310	101,954	102	**0**	0
CO_2*1	14,046,314	14,046	**14**	0
Total CO_2e	14,195,463	14,195	**14**	0

• APPENDIX A: 4. Greenhouse gas emissions from fish hatchery heaters (1999-2003)

2002	FUEL		EMISSIONS		
Month tank filled	Type of fuel	Quantity of propane fuel in litres (approximately)	CO_2 (g) Emission factor 1,500 g/l	CH_4 (g) Emission factor 0.24 g/l	N_2O (g) Emission factor 0.108 g/l
February	propane	1,717.69	2,576,541	412.25	185.51
April	propane	1,051.00	1,576,497	252.24	113.51
December	propane	1,259.10	1,888,650	302.18	135.98
Total			**6,041,688**	**966.67**	**435.00**

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	20,300.07	20	**0**	0
N_2O*310	134,850	135	**0**	0
CO_2*1	6,041,688	6,042	**6**	0
Total CO_2e	6,196,838	6,197	**6**	0

2003	FUEL		EMISSIONS		
Month tank filled	Type of fuel	Quantity of propane fuel in litres (approximately)	CO_2 (g) Emission factor 1,500 g/l	CH_4 (g) Emission factor 0.24 g/l	N_2O (g) Emission factor 0.108 g/l
January	propane	817.10	1,225,650	196.10	88.25
Total			**1,225,650**	**196.10**	**88.25**

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	4,118.18	4	**0**	0
N_2O*310	27,357	27	**0**	0
CO_2*1	1,225,650	1,226	**1**	0
Total CO_2e	1,257,125	1,257	**1**	0

Appendix B

Appendix B: 1. Quantifying CO_2e emissions reductions from Renewable Power Sales Incentive Program

Appendix B: 2. Quantifying CO_2e emissions reductions from energy efficiency and renewable energy initiatives

Renewable Power Sales Incentive Program buildings.

Building*	Community	Conversion date	Type of fuel displaced	Renewable power sales (kWh)	Actual quantity of fuel displaced (litres)	Estimated quantity of fuel displaced (litres)	Reported last year (litres)	Comments
Yukon College	Whitehorse	2001	oil	4,164,480	477,717		418,836	
Andrew Philipsen Law Centre	Whitehorse	2001	oil	649,800	74,540		122,472	
Extended Care Facility	Whitehorse	2001	oil	3,267,720	374,847		349,162	
YDC/ESC corporate building	Whitehorse	2002	oil	76,740	8,803		8,143	
Holy Family School	Whitehorse	2002	oil	341,325	39,154		71,549	
Duncan's Holdings Ltd.	Whitehorse	2002	oil	16,480		4,537		full year of data not available
211 Wood St.	Whitehorse	Dec 2002	oil	40,000		4,588		full year of data not available
J.V. Clarke School	Mayo	Jan 2003	oil	811,683		93,110	93,110	full year of data not available
Yukon Honda	Whitehorse	Feb 2003	oil	435,873		50,000	50,000	full year of data not available
Whitehorse Fish Hatchery	Whitehorse	Mar 2003	propane	30,000	8,189			
Yukon Brewing Co. (was Chilkoot Brewery)	Whitehorse	Mar 2003	oil	140,000		28,107	28,107	full year of data not available
Whitehorse Hospital	Whitehorse	Jun 2003	oil	7,934,203		910,150	910,150	full year of data not available
Quadra Equities	Whitehorse	Jun 2003	oil	87,600		10,049		full year of data not available
Ricky's Restaurant	Whitehorse	Jul 2003	oil	50,000		13,765		full year of data not available
Superstore	Whitehorse	Oct 2003	propane	850,903		150,000		full year of data not available
Boston Pizza	Whitehorse	2004	propane	600,000		105,770	139,339	current estimate
High Country Inn	Whitehorse	2004	oil	2,100,000		240,896		project not yet started
Aquatic Centre	Whitehorse	2004	oil	3,312,638		380,000	380,000	project not yet complete
Downtown Hotel	Dawson City	2004	oil	409,721		47,000	47,000	project not yet started
Prospector Building	Whitehorse	2004	oil	120,000		13,765		project not yet started
Total				**25,439,167**				

•in order by date that each building joined the program

• APPENDIX B: 1. Quantifying CO_2e emissions reductions from Renewable Power Sales Incentive Program

Yukon College	FUEL		EMISSIONS		
	Type of fuel	Quantity of fuel in litres (approximately)	CO_2 (g) Emission factor 2,830 g/l	CH_4 (g) Emission factor 0.006 g/l	N_2O (g) Emission factor 0.031 g/l
	light (distillate) oil	477,717.00	1,351,939,110.00	2,866.30	14,809.23

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	60,192.34	60	**0**	0
N_2O*310	4,590,860	4,591	**5**	0
CO_2*1	1,351,939,110	1,351,939	**1,352**	1
Total CO_2e	1,356,590,163	1,356,590	**1,357**	1

Andrew Philipsen Law Centre	FUEL		EMISSIONS		
	Type of fuel	Quantity of fuel in litres (approximately)	CO_2 (g) Emission factor 2,830 g/l	CH_4 (g) Emission factor 0.006 g/l	N_2O (g) Emission factor 0.031 g/l
	light (distillate) oil	74,540.00	210,948,200.00	447.24	2,310.74

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	9,392.04	9	**0**	0
N_2O*310	716,329	716	**1**	0
CO_2*1	210,948,200	210,948	**211**	0
Total CO_2e	211,673,921	211,674	**212**	0

Extended Care Facility	FUEL		EMISSIONS		
	Type of fuel	Quantity of fuel in litres (approximately)	CO_2 (g) Emission factor 2,830 g/l	CH_4 (g) Emission factor 0.006 g/l	N_2O (g) Emission factor 0.031 g/l
	light (distillate) oil	374,847.00	1,060,817,010.00	2,249.08	11,620.26

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	47,230.72	47	**0**	0
N_2O*310	3,602,280	3,602	**4**	0
CO_2*1	1,060,817,010	1,060,817	**1,061**	1
Total CO_2e	1,064,466,520	1,064,467	**1,064**	1

YDC/ESC corporate building, Lowe Street	FUEL		EMISSIONS		
	Type of fuel	Quantity of fuel in litres (approximately)	CO_2 (g) Emission factor 2,830 g/l	CH_4 (g) Emission factor 0.006 g/l	N_2O (g) Emission factor 0.031 g/l
	light (distillate) oil	8,143.00	23,044,690.00	48.86	252.43

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	1,026.02	1	**0**	0
N_2O*310	78,254	78	**0**	0
CO_2*1	23,044,6 90	23,045	**23**	0
Total CO_2e	23,123,970	23,124	**23**	0

• APPENDIX B: 1. Quantifying CO_2e emissions reductions from Renewable Power Sales Incentive Program

Holy Family School	FUEL		EMISSIONS		
	Type of fuel	Quantity of fuel in litres (approximately)	CO_2 (g) Emission factor 1,500 g/l	CH_4 (g) Emission factor 0.024 g/l	N_2O (g) Emission factor 0.108 g/l
	propane	39,154.00	58,731,000.00	939.70	4,228.63

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	19,733.62	20	**0**	0
N_2O*310	1,310,876	1,311	**1**	0
CO_2*1	58,731,000	58,731	**59**	0
Total CO_2e	60,061,610	60,062	**60**	0

Duncan's Holdings	FUEL		EMISSIONS		
	Type of fuel	Quantity of fuel in litres (approximately)	CO_2 (g) Emission factor 2,830 g/l	CH_4 (g) Emission factor 0.006 g/l	N_2O (g) Emission factor 0.031 g/l
	light (distillate) oil	4,537.00	12,839,710.00	27.22	140.65

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	571.66	1	**0**	0
N_2O*310	43,601	44	**0**	0
CO_2*1	12,839,710	12,840	**13**	0
Total CO_2e	12,883,882	12,884	**13**	0

Yukon News	FUEL		EMISSIONS		
	Type of fuel	Quantity of fuel in litres (approximately)	CO_2 (g) Emission factor 2,830 g/l	CH_4 (g) Emission factor 0.006 g/l	N_2O (g) Emission factor 0.031 g/l
	light (distillate) oil	4,588.00	12,984,040.00	27.53	142.23

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	578.09	1	**0**	0
N_2O*310	44,091	44	**0**	0
CO_2*1	12,984,040	12,984	**13**	0
Total CO_2e	13,028,709	13,029	**13**	0

J.V. Clark School	FUEL		EMISSIONS		
	Type of fuel	Quantity of fuel in litres (approximately)	CO_2 (g) Emission factor 2,830 g/l	CH_4 (g) Emission factor 0.006 g/l	N_2O (g) Emission factor 0.031 g/l
	light (distillate) oil	93,110.00	263,501,300.00	558.66	2,886.41

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	11,731.86	12	**0**	0
N_2O*310	894,787	895	**1**	0
CO_2*1	263,501,300	263,501	**264**	0
Total CO_2e	264,407,819	264,408	**264**	0

• APPENDIX B: 1. Quantifying CO_2e emissions reductions from Renewable Power Sales Incentive Program

Yukon Honda	FUEL		EMISSIONS		
	Type of fuel	Quantity of fuel in litres (approximately)	CO_2 (g) Emission factor 2,830 g/l	CH_4 (g) Emission factor 0.006 g/l	N_2O (g) Emission factor 0.031 g/l
	light (distillate) oil	50,000.00	141,500,000.00	300.00	1,550.00

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	6,300.00	6	**0**	0
N_2O*310	480,500	481	**0**	0
CO_2*1	141,500,000	141,500	**142**	0
Total CO_2e	141,986,800	141,987	**142**	0

Chilkoot Brewery	FUEL		EMISSIONS		
	Type of fuel	Quantity of fuel in litres (approximately)	CO_2 (g) Emission factor 2,830 g/l	CH_4 (g) Emission factor 0.006 g/l	N_2O (g) Emission factor 0.031 g/l
	light (distillate) oil	28,107.00	79,542,810.00	168.64	871.32

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	3,541.48	4	**0**	0
N_2O*310	270,108	270	**0**	0
CO_2*1	79,542,810	79,543	**80**	0
Total CO_2e	79,816,460	79,816	**80**	0

Whitehorse Hospital	FUEL		EMISSIONS		
	Type of fuel	Quantity of fuel in litres (approximately)	CO_2 (g) Emission factor 2,830 g/l	CH_4 (g) Emission factor 0.006 g/l	N_2O (g) Emission factor 0.031 g/l
	light (distillate) oil	910,150.00	2,575,724,500.00	5,460.90	28,214.65

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	114,678.90	115	**0**	0
N_2O*310	8,746,542	8,747	**9**	0
CO_2*1	2,575,724,500	2,575,725	**2,576**	3
Total CO_2e	2,584,585,720	2,584,586	**2,585**	3

Quadra Equities	FUEL		EMISSIONS		
	Type of fuel	Quantity of fuel in litres (approximately)	CO_2 (g) Emission factor 2,830 g/l	CH_4 (g) Emission factor 0.006 g/l	N_2O (g) Emission factor 0.031 g/l
	light (distillate) oil	10,049.00	28,438,670.00	60.29	311.52

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	1,266.17	1	**0**	0
N_2O*310	96,571	97	**0**	0
CO_2*1	28,438,670	28,439	**28**	0
Total CO_2e	28,536,507	28,537	**29**	0

• APPENDIX B: 1. Quantifying CO_2e emissions reductions from Renewable Power Sales Incentive Program

Ricky's Restaurant	FUEL		EMISSIONS		
	Type of fuel	Quantity of fuel in litres (approximately)	CO_2 (g) Emission factor 2,830 g/l	CH_4 (g) Emission factor 0.006 g/l	N_2O (g) Emission factor 0.031 g/l
	light (distillate) oil	13,765.00	38,954,950.00	82.59	426.72

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	1,734.39	2	**0**	0
N_2O*310	132,282	132	**0**	0
CO_2*1	38,954,950	38,955	**39**	0
Total CO_2e	39,088,966	39,089	**39**	0

Superstore	FUEL		EMISSIONS		
	Type of fuel	Quantity of fuel in litres (approximately)	CO_2 (g) Emission factor 2,830 g/l	CH_4 (g) Emission factor 0.006 g/l	N_2O (g) Emission factor 0.031 g/l
	light (distillate) oil	150,000.00	225,000,000.00	3,600.00	16,200.00

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	75,600.00	76	**0**	0
N_2O*310	5,022,000	5,022	**5**	0
CO_2*1	225,000,000	225,000	**225**	0
Total CO_2e	230,097,600	230,098	**230**	0

Boston Pizza	FUEL		EMISSIONS		
	Type of fuel	Quantity of fuel in litres (approximately)	CO_2 (g) Emission factor 1,500 g/l	CH_4 (g) Emission factor 0.024 g/l	N_2O (g) Emission factor 0.108 g/l
	propane	105,770.00	158,655,000.00	2,538.48	11,423.16

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	53,308.08	53	0	0
N_2O*310	3,541,180	3,541	4	0
CO_2*1	158,655,000	158,655	159	0
Total CO_2e	162,249,488	162,249	162	0

High Country Inn	FUEL		EMISSIONS		
	Type of fuel	Quantity of fuel in litres (approximately)	CO_2 (g) Emission factor 2,830 g/l	CH_4 (g) Emission factor 0.006 g/l	N_2O (g) Emission factor 0.031 g/l
	light (distillate) oil	240,896.00	681,735,680.00	6,263.30	3,131.65

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	131,529.22	132	**0**	0
N_2O*310	970,811	971	**1**	0
CO_2*1	681,735,680	681,736	**682**	1
Total CO_2e	682,838,020	682,838	**683**	1

• APPENDIX B: 1. Quantifying CO_2e emissions reductions from Renewable Power Sales Incentive Program

Aquatic Centre	FUEL		EMISSIONS		
	Type of fuel	Quantity of fuel in litres (approximately)	CO_2 (g) Emission factor 2,830 g/l	CH_4 (g) Emission factor 0.006 g/l	N_2O (g) Emission factor 0.031 g/l
	light (distillate) oil	380,000.00	1,075,400,000.00	2,280.00	11,780.00

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	47,880.00	48	**0**	0
N_2O*310	3,651,800	3,652	**4**	0
CO_2*1	1,075,400,000	1,075,400	**1,075**	1
Total CO_2e	1,079,099,680	1,079,100	**1,079**	1

Downtown Hotel	FUEL		EMISSIONS		
	Type of fuel	Quantity of fuel in litres (approximately)	CO_2 (g) Emission factor 2,830 g/l	CH_4 (g) Emission factor 0.006 g/l	N_2O (g) Emission factor 0.031 g/l
	light (distillate) oil	47,000.00	133,010,000.00	282.00	1,457.00

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	5,922.00	6	**0**	0
N_2O*310	451,670	452	**0**	0
CO_2*1	133,010,000	133,010	**133**	0
Total CO_2e	133,467,592	133,468	**133**	0

Prospector Building	FUEL		EMISSIONS		
	Type of fuel	Quantity of fuel in litres (approximately)	CO_2 (g) Emission factor 2,830 g/l	CH_4 (g) Emission factor 0.006 g/l	N_2O (g) Emission factor 0.031 g/l
	light (distillate) oil	13,765.00	38,954,950.00	82.59	426.72

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	1,734.39	2	**0**	0
N_2O*310	132,282	132	**0**	0
CO_2*1	38,954,950	38,955	**39**	0
Total CO_2e	39,088,966	39,089	**39**	0

Fridge exchange	FUEL		EMISSIONS		
	Type of fuel	Quantity of fuel in litres (approximately)	CO_2 (g) Emission factor (g/l) Light=2,830 g/l	CH_4 (g) Emission factor (g/l) Light=0.006 g/l	N_2O (g) Emission factor (g/l) Light=0.031 g/l
	light (distillate) oil industrial grade	26,315.79	74,473,684.21	157.89	815.79

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	3,315.79	3	**0**	0
N_2O*310	252,895	253	**0**	0
CO_2*1	74,473,684	74,474	**74**	0
Total CO_2e	74,729,895	74,730	**75**	0

litres of fuel based on 100 fridges at 1,000 kWh, electricity saved per fridge = 10,000 kWh divided by 3.8 kWh/litre diesel (the 3.8 kWh/litre is an industry standard, customized to Yukon conditions) = 26,316 litres

Vanier School	FUEL		EMISSIONS		
	Type of fuel	Quantity of fuel in litres (approximately)	CO_2 (g) Emission factor (g/l) Light=2,830 g/l	CH_4 (g) Emission factor (g/l) Light=0.006 g/l	N_2O (g) Emission factor (g/l) Light=0.031 g/l
	light (distillate) oil industrial grade	146,250.00	413,887,500.00	877.50	4,533.75

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	18,427.50	18	**0**	0
N_2O*310	1,405,463	1,405	**1**	0
CO_2*1	413,887,500	413,888	**414**	0
Total CO_2e	415,311,390	415,311	**415**	0

Residential Energy Management Program	FUEL		EMISSIONS		
Town	Litres of diesel saved	Quantity of fuel in litres (approximately)	CO_2 (g) Emission factor (g/l) 2,830 g/l	CH_4 (g) Emission factor (g/l) 0.006 g/l	N_2O (g) Emission factor (g/l) 0.031 g/l
Whitehorse		57,000	161,310,000	342	1767
Carmacks		2,700	7,641,000	16	83.7
Dawson		10,400	29,432,000	62	322.4
Total		**70,100**	**198,383,000.00**	**420.60**	**2,173.10**

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	8,833	9	**0**	0
N_2O*310	673,661	674	**1**	0
CO_2*1	198,383,000	198,383	**198**	0
Total CO_2e	199,065,494	199,065	**199**	0

• APPENDIX B: 2. Quantifying CO_2e emissions reductions from energy efficiency and renewable energy initiatives

Vestas wind turbine	FUEL	EMISSIONS		
		CO_2 (g) Emission factor (g/l) 2,830 g/l	CH_4 (g) Emission factor (g/l) 0.006 g/l	N_2O (g) Emission factor (g/l) 0.031 g/l
Town	Litres of diesel saved			
Whitehorse	350,000	990,500,000.00	2,100.00	10,850.00

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	44,100	44	0	0
N_2O*310	3,363,500	3,364	**3**	0
CO_2*1	990,500,000	990,500	**991**	1
Total CO_2e	993,907,600	993,908	**994**	0.99

Mayo to Dawson City transmission line	FUEL	EMISSIONS		
		CO_2 (g) Emission factor (g/l) Light=2,830 g/l	CH_4 (g) Emission factor (g/l) Light=0.006 g/l	N_2O (g) Emission factor (g/l) Light=0.031 g/l
	Litres of diesel saved			
	3,947,368.00	11,171,051,440.00	23,684.21	122,368.41

CO_2e	grams	kilograms	tonnes	mega tonnes
CH_4*21	497,368.37	497	**0**	0
N_2O*310	37,934,206	37,934	**38**	0
CO_2*1	11,171,051,440	11,171,051	**11,171**	11
Total CO_2e	11,209,483,015	11,209,483	**11,209**	11

litres of fuel based on 15,000,000 kWh electricity saved per year divided by 3.8 kWh/litre (the 3.8 kWh/litre is an industry standard, customized to Yukon conditions) = 3,947,368 litres

YUKON'S GROWING LEGACY

For northern energy solutions

The Yukon has a track record for initiative and performance validated by external evaluations and recognition by national governments and leading Canadian organizations and agencies.

Michael L. Barton
1993 Award of Merit for publication of "Architectural Design Guidelines for the Yukon" which included energy efficiency and green planning and design, awarded by International Winter Cities Association

Government of the Yukon
2000 Top Jurisdiction in Canada for Energy Efficiency, awarded in 2001 by Canadian Energy Efficiency Alliance

2001 Top Jurisdiction in Canada for Energy Efficiency, awarded in 2002 by Canadian Energy Efficiency Alliance

2002 Top Jurisdiction in Canada for Energy Efficiency, awarded in 2003 by Canadian Energy Efficiency Alliance

Kobayashi + Zedda Architects Ltd.
2002 Canadian selection for 2002 International Sustainable Building Conference in Oslo, Norway, awarded for the new Mayo school

Yukon Conservation Society, Yukon Development Corporation, Yukon Energy
2003 National Energy Efficiency Award for Outreach (House Calls Energy Efficiency Program), awarded by Natural Resources Canada

Yukon Energy
1999 National Energy Efficiency Award for Commercial/Industrial Buildings (for design of Yukon Energy Corporate & Technical Services Building), awarded by Natural Resources Canada

2001 R.J. Templin Award to John Maissan, Director of Technical Services, awarded by Canadian Wind Energy Association

2002 Territorial winner, Best Developed Outdoor Site (Whitehorse Fishway), awarded by Attractions Canada

2002 Territorial winner, Best Attraction of National or International Interest (Whitehorse Fishway), awarded by Attractions Canada

2002 Award of Excellence for Employee Safety, awarded by Canadian Electricity Association

Yukon Housing Corporation
1999 Finalist, National Energy Efficiency Award (Green Mortgage Program), awarded by Natural Resources Canada

Yukon Green Building Design Competition
2002 Kobayashi + Zedda Architects Ltd., award for best artistic interpretation of green architecture

2002 Sinclair and Associates, award for best analytical interpretation of green architecture

2002 Ferguson Simek Clark, award for best technically integrated interpretation of green architecture

Selkirk First Nation
2003 Yukon Community Energy Leadership award for outstanding commitment to improving energy efficiency and reducing greenhouse gas emissions that contribute to climate change, awarded by Yukon Development Corporation

Yukon Development Corporation
2001 Gold Level Reporter for tracking, reporting and reducing carbon dioxide emissions, awarded by Voluntary & Challenge Registry Inc.

2001 Outstanding Individual Leadership in Energy Efficiency to President & Chief Executive Officer, awarded in 2002 by Canadian Energy Efficiency Alliance

2002 Gold Level Reporter for tracking, reporting and reducing carbon dioxide emissions, awarded by Voluntary & Challenge Registry Inc.

2002 National Leadership Award for Greenhouse Gas Emission Reduction Action Plan by Small and Medium-size Enterprises, awarded by Voluntary Challenge & Registry Inc.

2003 ENERGY STAR® Market Transformation Award for Provincial/Territorial governments (2002 Fridge Exchange Program), awarded by Natural Resources Canada

2003 Silver Award for Innovative Management in recognition of Yukon Development's success in integrating the knowledge of many partnership organizations to provide energy solutions and environmental benefits to Yukon customers at the best prices, awarded by Institute of Public Administration of Canada